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MIGRATION OF COLLEGE AND UNIVERSITY STUDENTS, STATE OF WASHINGTON.

BY- GOSSMAN, CHARLES S. AND OTHERS

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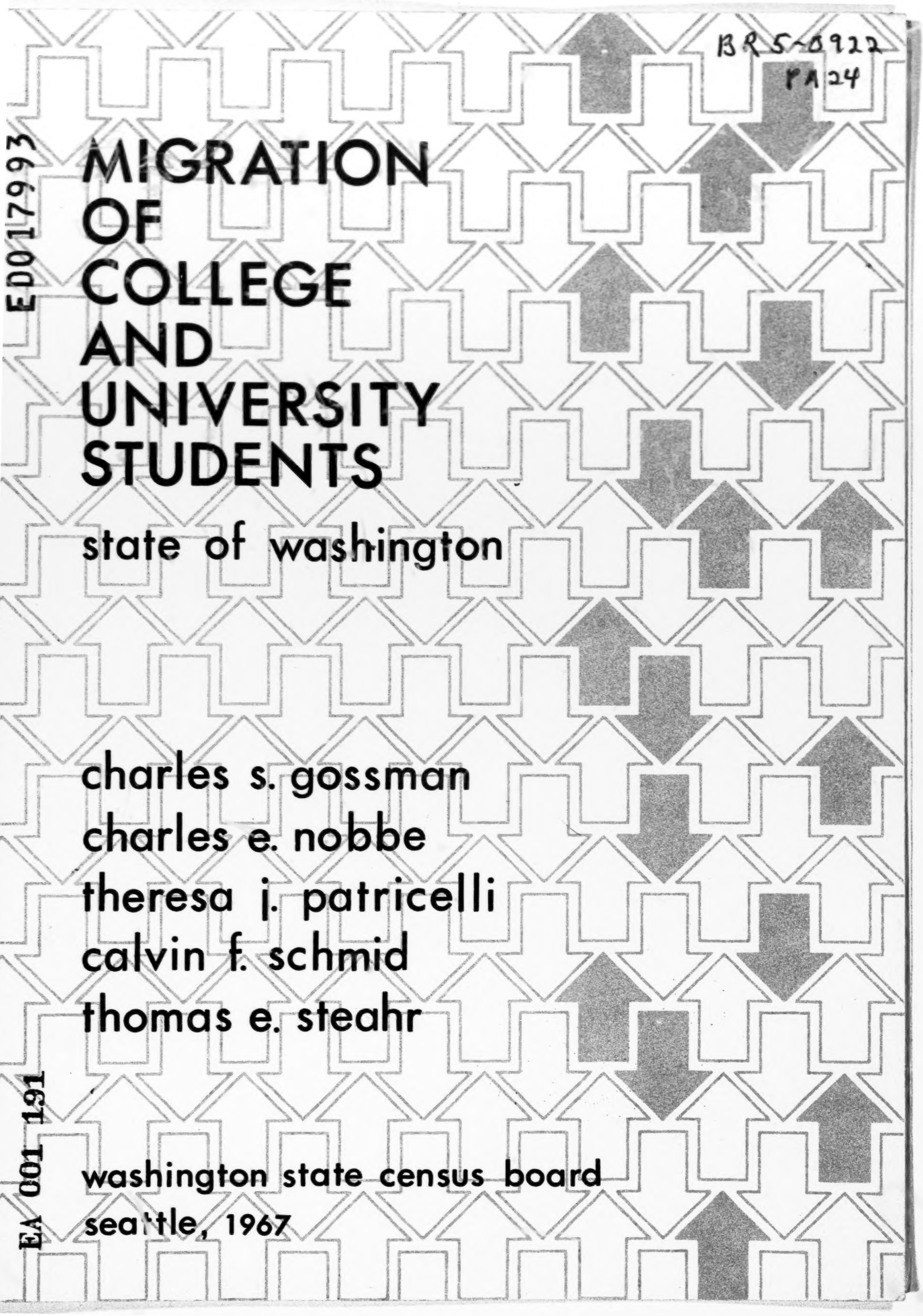
TWO GENERAL ASPECTS OF COLLEGE AND UNIVERSITY STUDENT MIGRATION AS IT RELATES TO THE STATE OF WASHINGTON ARE DISCUSSED. THE FIRST ASPECT INCLUDES ANALYSIS OF MIGRATION PATTERNS IN ACCORDANCE WITH ENROLLMENT CATEGORIES AND TYPES OF INSTITUTIONS, DIFFERENTIAL VOLUMES AND PATTERNS OF MIGRATION FOR SPECIFIC COLLEGES AND UNIVERSITIES IN THE STATE, AND TRENDS OF MIGRATION STREAMS TO AND FROM WASHINGTON STATE FROM 1938 TO 1963. SPECIFIC ENROLLMENT CATEGORIES STUDIED ARE UNDERGRADUATE, GRADUATE, AND FIRST PROFESSIONAL DEGREE STUDENTS IN BOTH PUBLIC AND PRIVATE INSTITUTIONS. THE SECOND AREA OF STUDY INCLUDES A REGRESSION ANALYSIS OF MIGRATION IN RELATION TO EDUCATIONAL, ECONOMIC, AND DEMOGRAPHIC FACTORS. HERE, GRAVITY MODELS USED IN EARLIER STUDIES OF MIGRATION ARE EVALUATED AND, AFTER APPROPRIATE MODIFICATION, ARE INCORPORATED INTO THE ANALYSIS. (HW)



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MIGRATION OF COLLEGE AND UNIVERSITY STUDENTS

state of washington

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EA 001 191

washington state census board
seattle, 1967

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STATE OF WASHINGTON

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PUBLISHED BY
WASHINGTON STATE CENSUS BOARD
SEATTLE, 1967

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FOREWORD

In undertaking this study, an effort has been made to produce a report that will be of interest and value, not only to the professional social scientist, but also to the educator, the governmental official, and the layman interested in problems of higher education. More specifically, it is hoped that this monograph will provide the professional demographer with certain data, generalizations and research techniques pertaining to the processes of human migration, as well as assist the educator and governmental officials in resolving certain administrative and planning problems concerning higher education. Today, there is greater need than ever before for accurate and systematic information about our educational system. Furthermore, there is growing realization that the more serious problems that constantly press for solution cannot be dealt with effectively without a wider and deeper understanding of the forces and conditions producing them, and that this understanding can be attained only by thorough and scientific study.

The report is devoted to an analysis of college and university student migration as it relates to a single state -- Washington. It is part of a larger, nation-wide study of student migration now in progress which is being conducted on a contractual basis with the United States Office of Education.

Although the present report is relatively modest in scope and content, it is the most detailed and comprehensive study of student migration that ever has been undertaken for a single state. This fact merely emphasizes the paucity of research in this area. It is hoped that additional studies of student migration for specific states will be produced from the extensive fund of data which we now have in our files.

We are particularly fortunate in having made available to us, in the form of special tabulations and computer tapes, a vast amount of statistics on student migration compiled in the fall of 1963 by the United States Office of Education in cooperation with the American Association of Collegiate Registrars and Admission Officers (AACRAO). In addition, for historical purposes, we have been able to derive important data from earlier studies conducted by AACRAO and by the U.S. Office of Education. All of the basic data on student migration in this report were obtained from these sources. The enrollment figures reported in this study may differ from those found in other publications. This report includes full-time and part-time students enrolled in programs at main or branch campuses in the 50 states and the District of Columbia which are wholly or principally creditable toward a bachelors' or higher degrees. Excluded are the following categories of students: (1) students reported as residents of foreign countries and outlying areas of the United States, (2) students in United States Service Schools, (3) students in schools in outlying areas of the United States, and (4) students in extension centers.

The plan of this study can be subsumed under two major divisions: The first six chapters present in some detail student migration patterns in accordance with certain enrollment categories and types of institutions. Chapter 7 examines differential volumes and patterns of migration for specific colleges and universities in the state of Washington, and Chapter 8 discusses trends of migration streams to and from Washington State from 1938 to 1963. The second major division, as presented in Chapter 9, is a regression analysis of migration in relation to educational, economic, and demographic factors. As part of this chapter, gravity models used in earlier studies of migration have been carefully evaluated, and after appropriate modification, incorporated into the present analysis.

It is a pleasure to express our appreciation to John T. Blue, Glen C. Boerrigter, Kenneth G. Nelson, Kenneth J. Neubeck, and Mabel Rice of the United States Office of Education for their invaluable cooperation and assistance. We are indebted to the following of our colleagues at the University of Washington for advice in resolving difficult methodological problems: Wayne P. Albin, Douglas G. Chapman, Stuart C. Dodd, and Vincent A. Miller. For drafting, typing, and editorial assistance, we are grateful to Gloria M. Austin, Rayma L. Birdsall, Jerry H. Durham, Myrtle E. Haug, Janice A. Jahnke, Donald S. Olofson, James F. Peterson, and Terrie L. Tsuneta.

Calvin F. Schmid
Professor of Sociology, and
Director, Office of Population Research
University of Washington
and
Executive Secretary, Washington State
Census Board

Seattle, Washington
May 1, 1967

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CHAPTER 1

MIGRATION OF ALL STUDENTS PUBLIC AND PRIVATE INSTITUTIONS[1]

Outmigration

In the fall of 1963, a total of 73,375 students enrolled in institutions of higher education in the United States reported Washington as their state of permanent residence.[2] Of this total, 9,699 migrated from Washington to colleges and universities located in other states. It may be observed in Figure 1:1 that in relation to the 50 states and the District of Columbia, Washington is represented among those states which had a relatively low rate (13.2) of outmigration.[3] Only one state within the Far West region, California (5.7), reported a lower rate of student outmigration.

---

[1] "Public" and "private" institutions are used in this report as synonymous with "publicly-controlled" and "privately-controlled" institutions, respectively. In order to clarify this distinction, it should be noted that "publicly-controlled" institutions are those that are administered directly through governmental organizations, regardless of the way in which they are financed. Similarly, "privately-controlled" institutions are administered through private auspices, although they may receive substantial support from governmental sources.

[2] The state of permanent residence of a student is distinguished from his local address. This is determined in different ways by institutions, depending on available records, state law, and institutional policy. College student migrants are those enrolled in institutions located outside their state of permanent residence. Students reporting their residence in a given state, regardless of where they are enrolled, constitute the resident student population of the state.

[3] Outmigration rate is defined as:

$$R_o = \frac{N_o}{N_s + N_o} \quad k$$

where

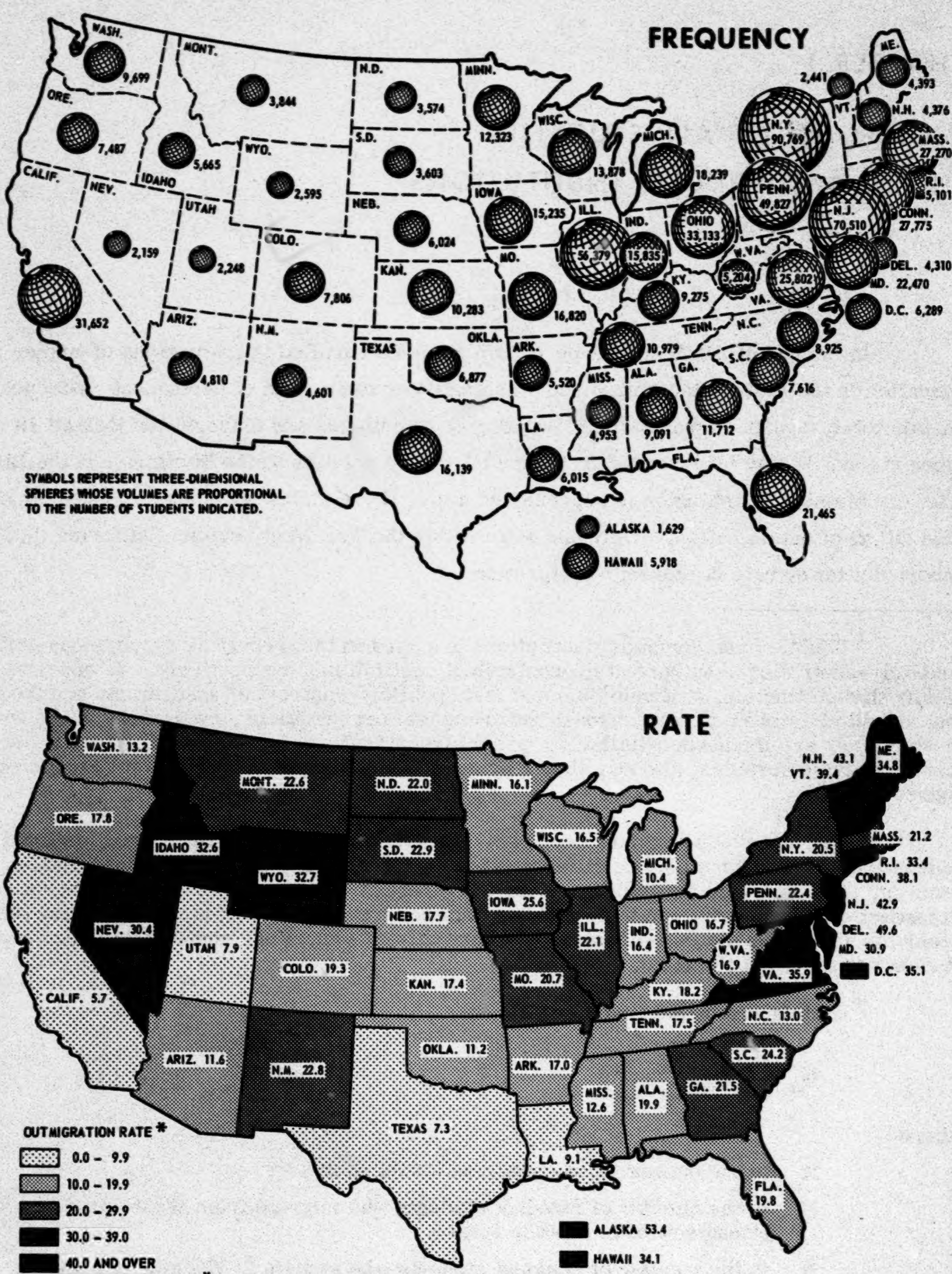
R_o is the outmigration rate from Washington

N_o is the number of resident students who migrate from Washington to attend school in another state

N_s is the number of resident students who remain in Washington, and

k is a constant $(k = 100)$

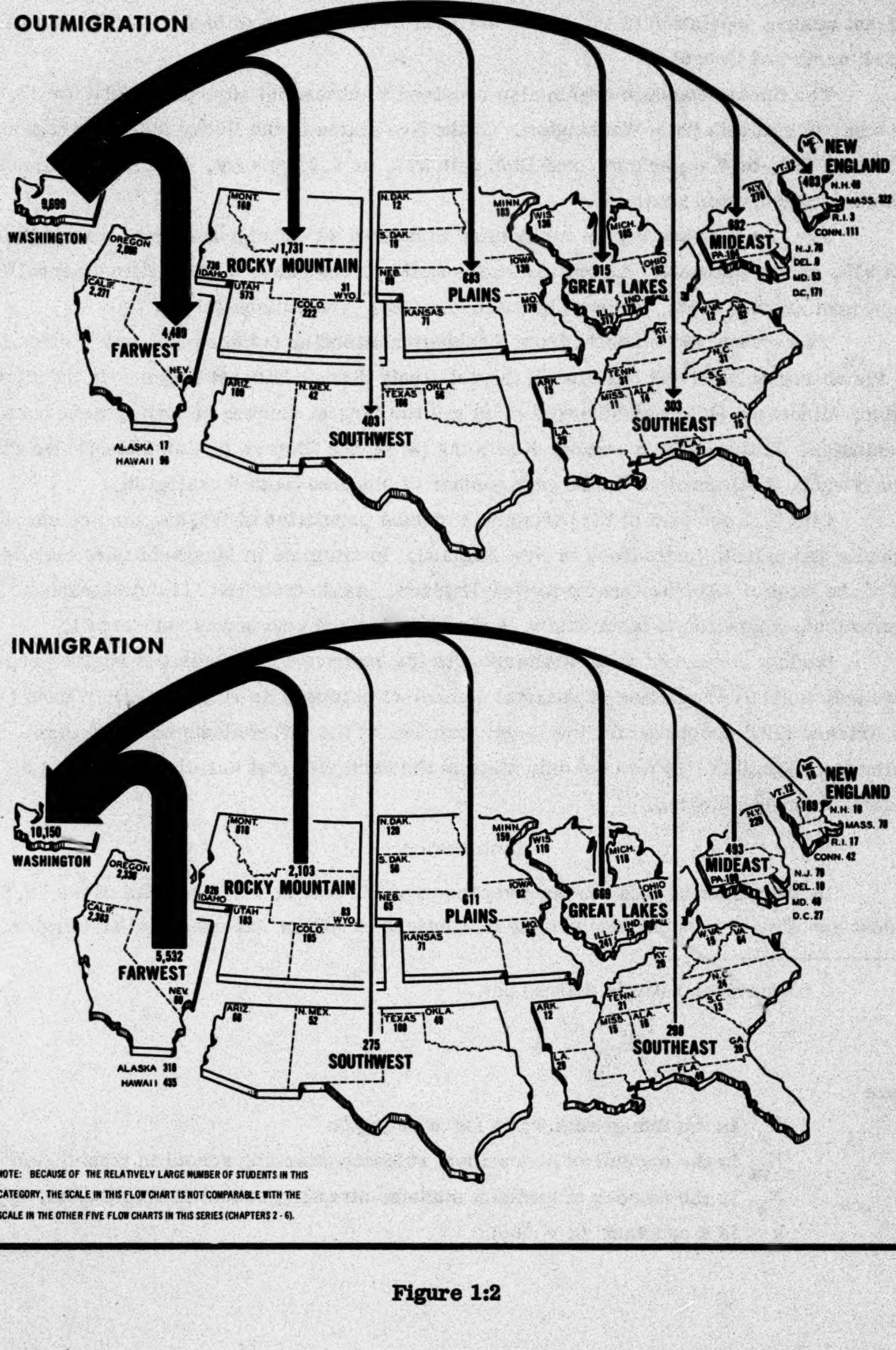
OUTMIGRATION - ALL STUDENTS
PUBLIC AND PRIVATE INSTITUTIONS, UNITED STATES: 1963


FREQUENCY
WASH. 9,699
ORE. 7,487
CALIF. 31,652
NEV. 2,159
IDAHO 5,665
MONT. 3,844
WYO. 2,595
UTAH 2,248
COLO. 7,806
ARIZ. 4,810
N.M. 4,601
N.D. 3,574
S.D. 3,603
NEB. 6,024
KAN. 10,283
OKLA. 6,877
TEXAS 16,139
MINN. 12,323
IOWA 15,235
MO. 16,820
ARK. 5,520
LA. 6,015
WISC. 13,878
ILL. 56,379
MICH. 10,239
IND. 15,835
OHIO 33,133
KY. 9,275
TENN. 10,979
MISS. 4,953
ALA. 9,091
GA. 11,712
FLA. 21,465
S.C. 7,616
N.C. 8,925
VA. 25,802
W.VA. 5,204
PENN. 49,827
N.Y. 90,769
VT. 2,441
ME. 4,393
N.H. 4,376
MASS. 27,270
R.I. 5,101
CONN. 27,775
N.J. 70,510
DEL. 4,310
MD. 22,470
D.C. 6,289
ALASKA 1,629
HAWAII 5,918
SYMBOLS REPRESENT THREE-DIMENSIONAL SPHERES WHOSE VOLUMES ARE PROPORTIONAL TO THE NUMBER OF STUDENTS INDICATED.
RATE
WASH. 13.2
ORE. 17.8
CALIF. 5.7
NEV. 30.4
IDAHO 32.6
MONT. 22.6
WYO. 32.7
UTAH 7.9
COLO. 19.3
ARIZ. 11.6
N.M. 22.8
N.D. 22.0
S.D. 22.9
NEB. 17.7
KAN. 17.4
OKLA. 11.2
TEXAS 7.3
MINN. 16.1
IOWA 25.6
MO. 20.7
ARK. 17.0
LA. 9.1
WISC. 16.5
ILL. 22.1
MICH. 10.4
IND. 16.4
OHIO 16.7
KY. 18.2
TENN. 17.5
MISS. 12.6
ALA. 19.9
GA. 21.5
FLA. 19.8
S.C. 24.2
N.C. 13.0
VA. 35.9
W.VA. 16.9
PENN. 22.4
N.Y. 20.5
N.H. 43.1
VT. 39.4
ME. 34.8
MASS. 21.2
R.I. 33.4
CONN. 38.1
N.J. 42.9
DEL. 49.6
MD. 30.9
D.C. 35.1
ALASKA 53.4
HAWAII 34.1
OUTMIGRATION RATE *
0.0 - 9.9
10.0 – 19.9
20.0 – 29.9
30.0 – 39.0
40.0 AND OVER

* SEE TEXT FOR DEFINITION OF OUTMIGRATION RATE

Figure 1:1

MIGRATION STREAMS - ALL STUDENTS
PUBLIC AND PRIVATE INSTITUTIONS, WASHINGTON: 1963



OUTMIGRATION

INMIGRATION

WASHINGTON
9,698
OREGON 2,096
CALIF. 2,271
4,489
FARWEST
NEV. 8
ALASKA 17
HAWAII 96
MONT. 169
1,731
738 IDAHO
ROCKY MOUNTAIN
UTAH 573
31 WYO.
COLO. 222
ARIZ. 109
N. MEX. 42
403
SOUTHWEST
TEXAS 186
OKLA. 56
N. DAK. 12
S. DAK. 19
NEB. 69
683
PLAINS
KANSAS 71
MINN. 183
IOWA 130
MO. 170
WIS. 136
MICH. 165
915
GREAT LAKES
OHIO 102
ILL. 317
IND. 175
KY. 31
TENN. 31
ARK. 15
MISS. 11
ALA. 14
LA. 25
303
SOUTHEAST
GA. 15
FLA. 27
W. VA. 12
VA. 52
N.C. 31
S.C. 25
682
MIDEAST
N.Y. 270
PA. 196
N.J. 78
DEL. 8
MD. 53
D.C. 171
NEW ENGLAND
ME. 5
VT. 12
403
N.H. 40
MASS. 322
R.I. 3
CONN. 111
10,150
WASHINGTON
OREGON 2,330
CALIF. 2,383
5,532
FARWEST
NEV. 60
ALASKA 318
HAWAII 435
MONT. 818
2,103
826 IDAHO
ROCKY MOUNTAIN
UTAH 183
83 WYO.
COLO. 185
ARIZ. 66
N. MEX. 52
275
SOUTHWEST
TEXAS 108
OKLA. 49
N. DAK. 120
S. DAK. 56
NEB. 65
611
PLAINS
KANSAS 71
MINN. 159
IOWA 82
MO. 56
WIS. 110
MICH. 110
669
GREAT LAKES
OHIO 118
ILL. 241
IND. 75
KY. 29
TENN. 21
ARK. 12
MISS. 15
ALA. 18
LA. 29
298
SOUTHEAST
GA. 20
FLA. 48
W. VA. 15
VA. 64
N.C. 24
S.C. 13
493
MIDEAST
N.Y. 220
PA. 180
N.J. 79
DEL. 10
MD. 40
D.C. 27
NEW ENGLAND
ME. 10
VT. 12
169
N.H. 18
MASS. 78
R.I. 17
CONN. 42

NOTE: BECAUSE OF THE RELATIVELY LARGE NUMBER OF STUDENTS IN THIS CATEGORY, THE SCALE IN THIS FLOW CHART IS NOT COMPARABLE WITH THE SCALE IN THE OTHER FIVE FLOW CHARTS IN THIS SERIES (CHAPTERS 2 - 6).

Figure 1:2

The pattern of outmigration for Washington shown in Figure 1:2 indicates an extremely large number of outmigrants, 4,489, or 46.3 per cent, enrolled in institutions within the Far West region. Washington residents attending colleges and universities in California numbered 2,271, or 23.4 per cent, and those attending institutions in Oregon comprised 2,096, or 21.6 per cent. Thus, 4,367, or 45.0 per cent, of Washington's outmigrant student population in 1963 were enrolled in institutions of higher learning located in California and Oregon.

The Rocky Mountain region also received a substantial number, 1,731, or 17.8 per cent, of students from Washington. Of the five states in the Rocky Mountain region, Idaho with 736, or 7.6 per cent, and Utah with 573, or 5.9 per cent, enrolled the largest number of Washington students.

The Great Lakes region ranks third in number of outmigrants from Washington with 915, or 9.4 per cent. Among the states in the Great Lakes region, Illinois enrolled the largest number (317), followed by Michigan (185), and Indiana (175).

There were 683 students from Washington attending colleges and universities in the Plains region, and 682 enrolled in the relatively distant Mideast region. In the Plains region, Minnesota (183) and Missouri (179) had the largest number of outmigrants from Washington. In the Mideast region, New York (278), the District of Columbia (171), and Pennsylvania (104) enrolled the largest number of students from Washington.

Only 5.1 per cent of the outmigrant student population of Washington are enrolled in public and private institutions in New England. Institutions in Massachusetts enrolled 322 of the total of 493 outmigrants to New England. Aside from the 111 outmigrants to Connecticut, migration to other states in the New England region was very small.

Student movement from Washington to the Southwest and Southeast regions represents only a small proportion of the total number of outmigrants (Figure 1:2). Texas (196) and Arizona (109) accounted for the largest number of the 403 students enrolled in the Southwest. Virginia (52) was the only state in the Southeast that enrolled more than 50 students from Washington.

Inmigration

In 1963, nonresident students represented 10,150, or 13.7 per cent of the 73,826 student enrollment in public and private institutions of higher education in Washington.[4]

---

[4] Inmigration ratio is defined as:

$$R_r = \frac{N_m}{N_s + N_m} k$$

where

R_r is the inmigration ratio for Washington

N_m is the number of nonresident students attending school in Washington

N_s is the number of resident students attending school in Washington, and

k is a constant $(k = 100)$

Figure 1:3, which shows inmigration ratios for each of the 50 states and the District of Columbia, indicates that Washington enrolled a comparatively small percentage of students from other states. However, three other states in the Far West -- California (6.1), Nevada (11.1), and Alaska (12.1) -- enrolled a lower percentage of nonresident students than Washington. It may be observed from Figure 1:2 that the 5,532 inmigrants to Washington from states within the Far West region represent over one-half (54.5 per cent) of the total of 10,150 nonresident students. There is a noticeably large number of inmigrants to Washington from California (2,383) and Oregon (2,336), representing 23.5 per cent and 23.0 per cent, respectively, of all inmigrants.

The Rocky Mountain region contributed the second largest number of inmigrants with 2,103, or 20.7 per cent, to Washington. A relatively large proportion came from Idaho (826) and Montana (816).

The 7,635 inmigrants from the Far West and Rocky Mountain regions, combined, represented 75.2 per cent of the total of 10,150 inmigrants.

Among the remaining regions, the 669 (6.6 per cent) inmigrants to Washington from states in the Great Lakes region comprise the third largest number of inmigrants. The largest number came from Illinois (241). However, each of the states in the Great Lakes region, with the exception of Indiana, had more than 100 students attending Washington institutions of higher education.

Inmigrants from the Plains region represent 6.0 per cent of the total number of nonresident students enrolled in Washington. Of the 611 inmigrants from the states in the Plains region, the largest number came from Minnesota (159) and North Dakota (120).

Student movement from the Mideast and New England regions, combined, represented only 6.6 per cent of Washington's inmigrants. Of the 493 inmigrants to Washington from the Mideast, nearly one-half (220) came from New York.

The number of inmigrants to Washington from the Southeast, 298, or 2.9 per cent, and Southwest, 275, or 2.7 per cent, represented only a relatively small proportion of the total nonresident enrollment in Washington.

Net Migration

In the fall of 1963, Washington indicated a net migration gain of 451 students attending public and private institutions (Table 1:I).[5] Washington showed the largest number of net migrants from the Far West region (1,043). Of the five other states in this region, Hawaii (339) and Alaska (301) contributed the largest number, followed by Oregon (240) and California (112). The only other region which displayed a net inmigration to Washington was the Rocky Mountain region with 372 students. Two states of the five in this region, Montana (647) and Idaho (90), showed high net inmigration to Washington.

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[5] Net migration is the number of inmigrants minus the number of outmigrants.

INMIGRATION - ALL STUDENTS
PUBLIC AND PRIVATE INSTITUTIONS, UNITED STATES: 1963

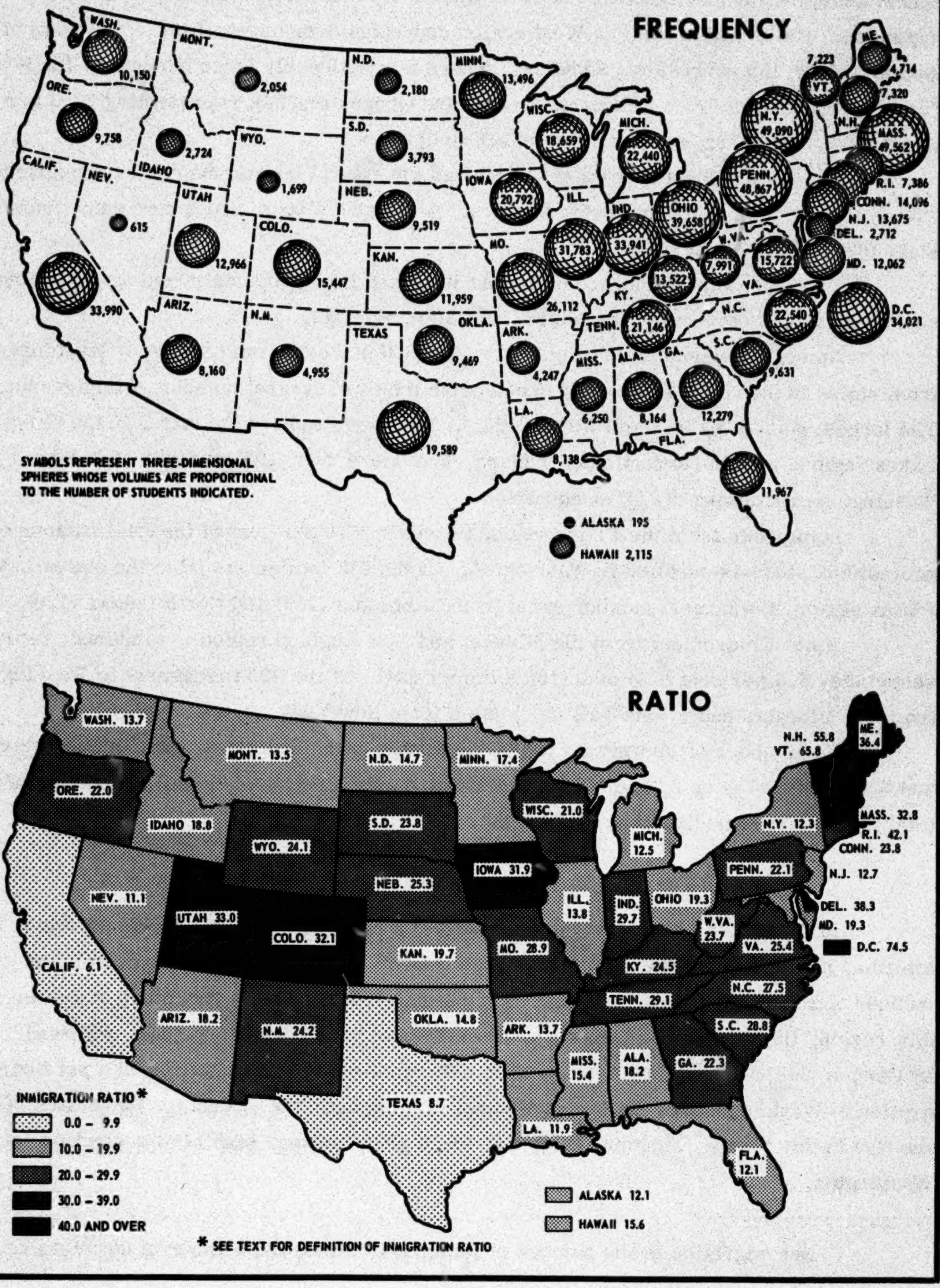
FREQUENCY
WASH. 10,150
MONT. 2,054
N.D. 2,180
MINN. 13,496
ORE. 9,758
IDAHO 2,724
WYO. 1,699
S.D. 3,793
WISC. 18,659
MICH. 22,440
CALIF. 33,990
NEV. 615
UTAH 12,966
COLO. 15,447
NEB. 9,519
IOWA 20,792
ILL. 31,783
IND. 33,941
OHIO 39,658
KAN. 11,959
MO. 26,112
ARIZ. 8,160
N.M. 4,955
TEXAS 19,589
OKLA. 9,469
ARK. 4,247
LA. 8,138
MISS. 6,250
ALA. 8,164
GA. 12,279
FLA. 11,967
TENN. 21,146
KY. 13,522
W.VA. 7,991
VA. 15,722
N.C. 22,540
S.C. 9,631
D.C. 34,021
MD. 12,062
DEL. 2,712
N.J. 13,675
CONN. 14,096
R.I. 7,386
MASS. 49,562
N.H. 7,320
ME. 4,714
VT. 7,223
N.Y. 49,090
PENN. 48,867
SYMBOLS REPRESENT THREE-DIMENSIONAL SPHERES WHOSE VOLUMES ARE PROPORTIONAL TO THE NUMBER OF STUDENTS INDICATED.
ALASKA 195
HAWAII 2,115
RATIO
WASH. 13.7
MONT. 13.5
N.D. 14.7
MINN. 17.4
ORE. 22.0
IDAHO 18.8
WYO. 24.1
S.D. 23.8
WISC. 21.0
MICH. 12.5
N.H. 55.8
VT. 65.8
ME. 36.4
N.Y. 12.3
MASS. 32.8
R.I. 42.1
CONN. 23.8
N.J. 12.7
PENN. 22.1
DEL. 38.3
MD. 19.3
D.C. 74.5
NEV. 11.1
UTAH 33.0
COLO. 32.1
NEB. 25.3
IOWA 31.9
ILL. 13.8
IND. 29.7
OHIO 19.3
W.VA. 23.7
VA. 25.4
KY. 24.5
MO. 28.9
KAN. 19.7
CALIF. 6.1
TENN. 29.1
N.C. 27.5
S.C. 28.8
ARIZ. 18.2
N.M. 24.2
OKLA. 14.8
ARK. 13.7
MISS. 15.4
ALA. 18.2
GA. 22.3
TEXAS 8.7
LA. 11.9
FLA. 12.1
INMIGRATION RATIO*
0.0 - 9.9
10.0 - 19.9
20.0 - 29.9
30.0 - 39.0
40.0 AND OVER
ALASKA 12.1
HAWAII 15.6
* SEE TEXT FOR DEFINITION OF INMIGRATION RATIO

Figure 1:3

TABLE 1:I

Net Migration of All Students
Public and Private Institutions by Region and State
Washington: 1963

Region and State	Net Migration	Region and State	Net Migration
Total	451	Southeast	- 5
New England	- 324	Alabama	2
Connecticut	- 69	Arkansas	- 3
Maine	5	Florida	22
Massachusetts	- 244	Georgia	5
New Hampshire	- 30	Kentucky	- 11
Rhode Island	14	Louisiana	0
Vermont	0	Mississippi	4
Mideast	- 189	North Carolina	- 7
Delaware	10	South Carolina	- 22
District of Columbia	- 144	Tennessee	- 10
Maryland	- 5	Virginia	12
New Jersey	3	West Virginia	3
New York	- 58	Southwest	- 128
Pennsylvania	5	Arizona	- 43
Great Lakes	- 246	New Mexico	10
Illinois	- 76	Oklahoma	- 7
Indiana	- 100	Texas	- 88
Michigan	- 67	Rocky Mountain	372
Ohio	14	Colorado	- 27
Wisconsin	- 17	Idaho	90
Plains	- 72	Montana	647
Iowa	- 48	Utah	- 390
Kansas	0	Wyoming	52
Minnesota	- 24	Far West	1,043
Missouri	- 123	Alaska	301
Nebraska	- 24	California	112
North Dakota	108	Hawaii	339
South Dakota	39	Nevada	51
		Oregon	240

Washington had a net loss of students to all of the remaining regions. New England (324) drew the largest net number of students from Washington, although it is the most distant region. Massachusetts was the state within this region to draw the largest net number, 244. There was also a large net outmigration from Washington to the Great Lakes region (246), with the largest number of these students attending institutions in

Indiana (100). Although there was a net loss of students from Washington to the Southeast and Plains regions, the numbers are too small to be considered significant.

In summary, Washington displayed a net loss to six of the eight regions, but the large net migration to Washington from the Far West and Rocky Mountain regions resulted in a total net gain of 451 students.

CHAPTER 2

MIGRATION OF UNDERGRADUATE STUDENTS PUBLIC INSTITUTIONS[1]

Outmigration

On a nation-wide basis, Washington (5.4) is represented among the ten states with lowest rates of outmigration of undergraduates to public institutions. Only 2,667 of the 49,563 resident undergraduate students in this category attended public institutions outside of Washington State (Figure 2:1).

Of the 2,667 outmigrants in this category, approximately one-half (49.5 per cent) migrated to states within the Far West region. Moreover, of the 1,319 migrants from Washington, the majority attended institutions in California (699) and Oregon (524). In fact, the number of outmigrants to California and Oregon represented respectively, 26.2 per cent and 19.6 per cent of the total of 2,667 outmigrants in this category.

The second largest number of undergraduate students, 754, or 28.3 per cent, attended public institutions in the Rocky Mountain region. In the Rocky Mountain region, the largest number of Washington residents attended public schools in Idaho (471) and Montana (136). The Far West and Rocky Mountain regions, combined, enrolled 2,073, or 77.7 per cent, of Washington undergraduate students attending public institutions outside the State.

There is a sharp decrease in the number of outmigrants to regions east of the Rocky Mountain region. The Southwest had the third largest number of outmigrants from Washington, 204, but these students represented only 7.6 per cent of the total number of outmigrants in this category. Notably few undergraduate students from Washington were enrolled in public institutions in the Great Lakes region (96), Mideast region (28), and New England region (6).

Inmigration

In 1963, there were 50,411 undergraduates enrolled in Washington's public institutions of higher education. Of this total, 3,515, or 7.0 per cent, were reported

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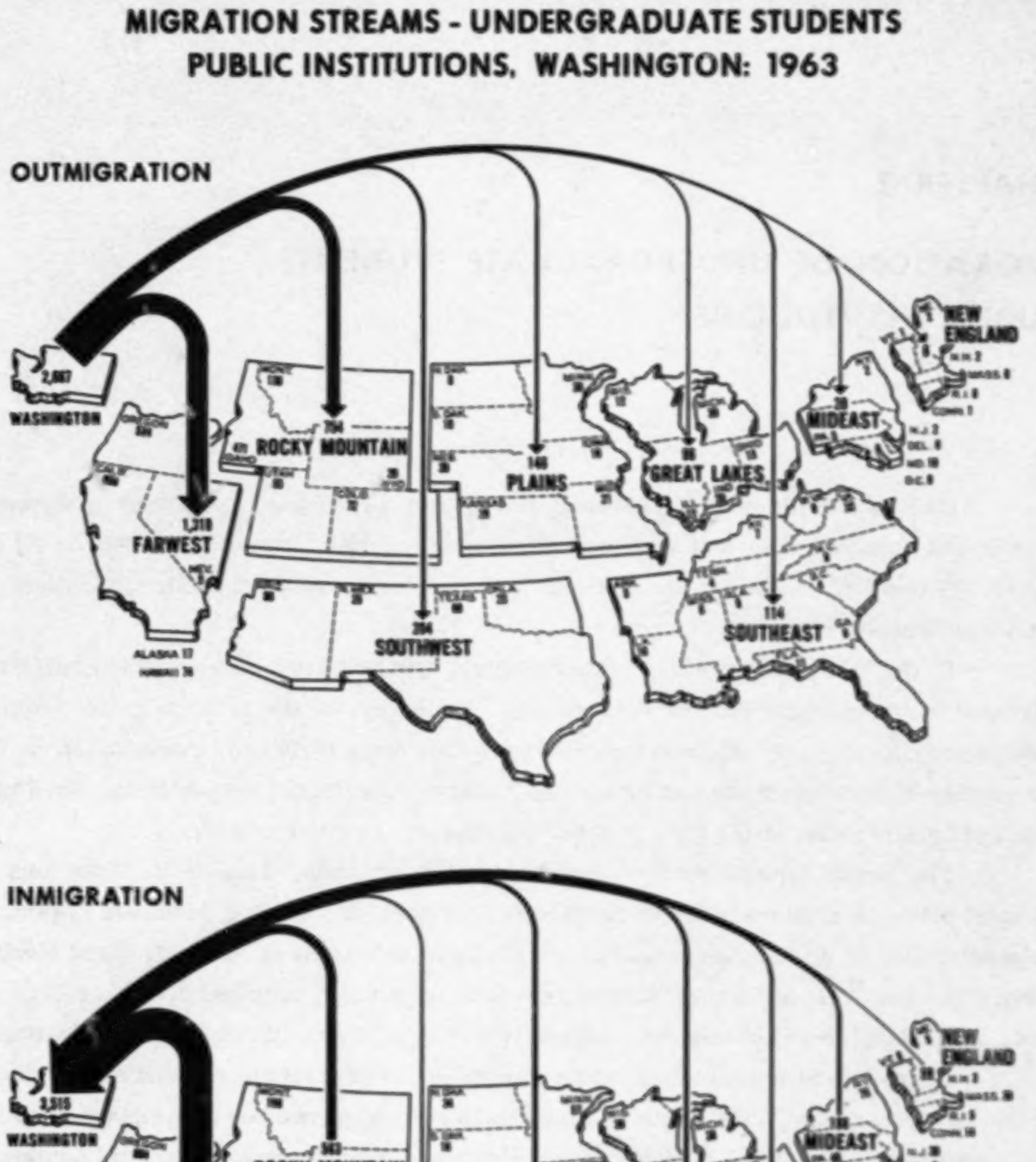
[1] Undergraduate students are defined as students who have not yet completed a full four-year program or its equivalent, and also those in five-year bachelors' degree programs and students in cooperative programs.



MIGRATION STREAMS - UNDERGRADUATE STUDENTS
PUBLIC INSTITUTIONS, WASHINGTON: 1963

OUTMIGRATION
WASHINGTON
FARWEST
1,318
ROCKY MOUNTAIN
704
PLAINS
SOUTHWEST
204
GREAT LAKES
MIDEAST
NEW ENGLAND
SOUTHEAST
114
ALASKA 17
HAWAII 74
INMIGRATION
WASHINGTON
3,515
FARWEST
2,072
ROCKY MOUNTAIN
PLAINS
SOUTHWEST
GREAT LAKES
MIDEAST
NEW ENGLAND
SOUTHEAST

Figure 2:1

TABLE 2:I

Net Migration of Undergraduate Students
Public Institutions by Region and State
Washington: 1963

Region and State	Net Migration
Total	848
New England	53
Connecticut	13
Maine	3
Massachusetts	26
New Hampshire	1
Rhode Island	5
Vermont	5
Mideast	158
Delaware	2
District of Columbia	12
Maryland	- 1
New Jersey	28
New York	73
Pennsylvania	44
Great Lakes	138
Illinois	84
Indiana	6
Michigan	- 1
Ohio	23
Wisconsin	26
Plains	58
Iowa	21
Kansas	0
Minnesota	18
Missouri	1
Nebraska	- 14
North Dakota	26
South Dakota	6
Southeast	24
Alabama	- 2
Arkansas	2
Florida	13
Georgia	7
Kentucky	- 2
Louisiana	1
Mississippi	- 2
North Carolina	- 1
South Carolina	1
Tennessee	4
Virginia	5
West Virginia	- 2
Southwest	- 95
Arizona	- 72
New Mexico	- 12
Oklahoma	- 2
Texas	- 9
Rocky Mountain	-191
Colorado	- 27
Idaho	-202
Montana	60
Utah	- 22
Wyoming	0
Far West	703
Alaska	134
California	100
Hawaii	168
Nevada	21
Oregon	280

as nonresidents (Figure 2:1). On a nation-wide basis, Washington was represented among the thirteen states in which nonresident students comprised less than ten per cent of the total enrollment.

At the undergraduate level, it is apparent that public institutions of higher education in Washington tend to serve the student from the Far West, as well as the resident student. Intraregional migrants comprised 2,022, or 57.5 per cent, of nonresident students enrolled in Washington. For the Far West region, the largest numbers of inmigrant undergraduate students attending public institutions in Washington are from Oregon with 804, or 22.9 per cent, and California with 799, or 22.7 per cent.

Also, there is a relatively large number of inmigrants from Idaho with 269, or 7.7 per cent, and Montana with 196, or 5.6 per cent. The Rocky Mountain region with 563, or 16.0 per cent, ranks second in number of inmigrants to Washington.

Other regions which had a relatively large number of undergraduate students attending public schools in Washington were the Great Lakes, 234, or 5.7 per cent, the Plains, 204, or 5.8 per cent, and the Mideast, 186, or 5.3 per cent.

Net Migration

Washington showed a total net migration gain of 848 undergraduates enrolled in public institutions (Table 2:I). There is, however, some variation among regions. The region which reported the highest net inmigration to Washington was the Far West with 703. Among the five remaining states in this region, Washington had the highest net inmigration from Oregon (280), Hawaii (168), and Alaska (134). The Mideast with 158 was the highest of the five regions which reported net outmigration to Washington. Within the Mideast, New York (73) and Pennsylvania (44) contributed the largest number of net migrants. The region ranking third highest in number of net migrants to Washington was the Great Lakes region with 138. Illinois (84) and Wisconsin (26) were the two states in this region which sent the largest number of net migrants. The Plains (58), New England (53), and Southeast (24) regions accounted for only a small proportion of the net inmigration to Washington.

Washington experienced a net loss of undergraduates attending public institutions in the Rocky Mountain and Southwest regions. The Rocky Mountain region had the largest net gain with 191 undergraduate students. Within the Rocky Mountain region, Idaho was the most outstanding state with a net gain from Washington of 202 students. The Southwest region had a small net migration gain of 95 students.

In summary, Washington experienced a net migration gain from six of the eight regions in this student category. The Far West region contributed the largest number of net migrants to Washington, while the largest number of net migrants from Washington attended public institutions in the Rocky Mountain region.

CHAPTER 3

MIGRATION OF GRADUATE STUDENTS PUBLIC INSTITUTIONS[1]

Outmigration

In 1963, there were 848 graduate students reporting Washington as their home state who sought advanced degrees in public institutions in other states (Figure 3:1). This number represents an outmigration rate of 23.0 for the 3,679 Washington residents enrolled in public institutions as graduate students.

On a nation-wide basis, the proportion of outmigrants among graduate students attending public institutions of higher learning is much higher than for undergraduate students. In 1963, the 2,265,835 undergraduates enrolled in public institutions had an outmigration rate of 9.0, in comparison to 19.4 for the 260,672 graduate students. The outmigration rate for Washington in this student category is close to the median in a distribution of outmigration rates by state.

It will be observed from Figure 3:1 that 363, or 42.8 per cent, of the outmigrants are included in the Far West Region. The largest number were enrolled in California with 210, or 24.8 per cent, and Oregon with 131, or 15.4 per cent.

Only in two other regions, the Great Lakes with 178, or 21.0 per cent, and the Plains with 104, or 12.3 per cent, do public institutions attract a significant number of graduate students from the state of Washington,

In the Great Lakes region, Indiana (50) and Illinois (40) drew the largest number of graduate students from Washington. In the Plains region, Minnesota (50) enrolled in public institutions the largest number of graduate students from Washington.

Inmigration

At the graduate level, nonresident students represent 36.9 per cent of the 4,489 students enrolled in public institutions. On a nation-wide basis, the state of Washington

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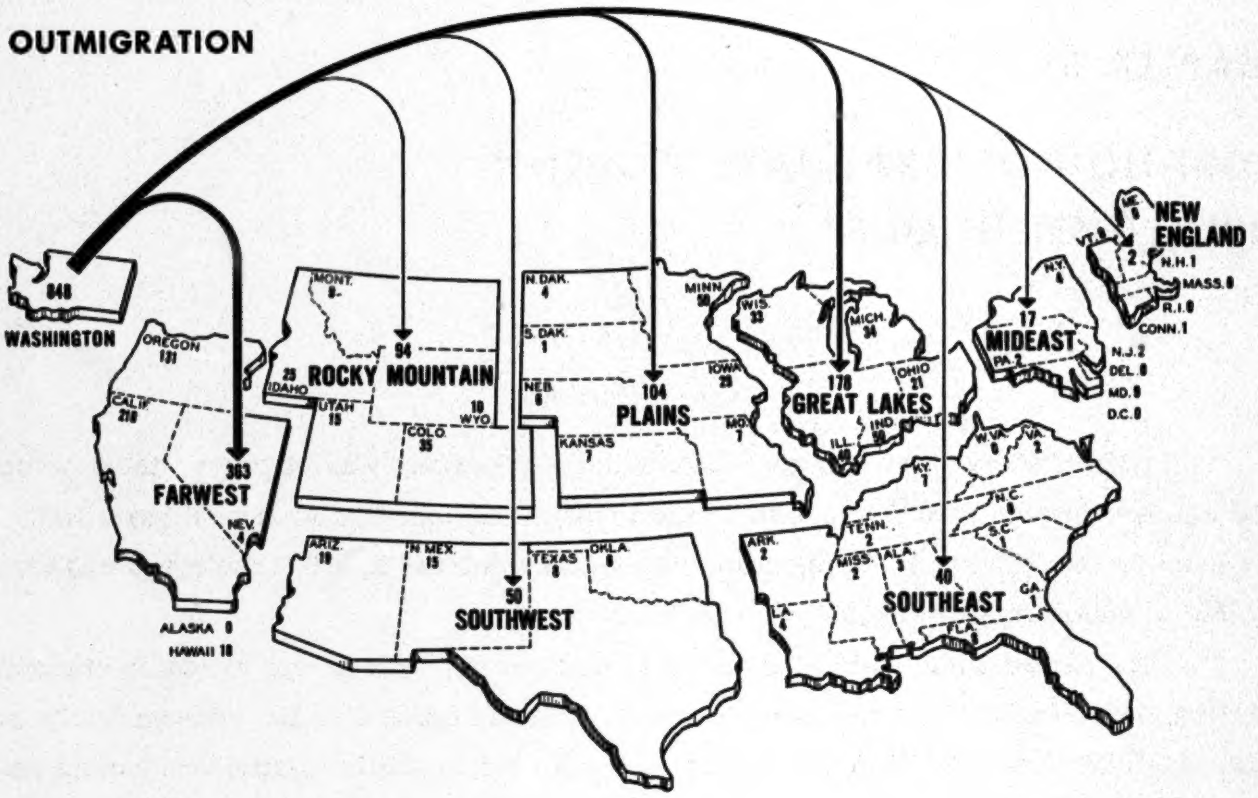
[1] Graduate students are defined as students who have completed a bachelors' degree program and are enrolled in graduate school in Liberal Arts and Sciences. Also, included are those students beyond the first professional degree. Excluded are those students studying for M.D., D.D.S., LL.B., or other first professional degrees.

MIGRATION STREAMS - GRADUATE STUDENTS PUBLIC INSTITUTIONS, WASHINGTON: 1963

OUTMIGRATION


868
WASHINGTON
OREGON 131
CALIF. 238
NEV. 4
383
FARWEST
ALASKA 0
HAWAII 10
MONT. 9
25 IDAHO
UTAH 15
10 WYO
COLO. 35
94
ROCKY MOUNTAIN
ARIZ. 19
N. MEX. 15
TEXAS 8
OKLA. 8
50
SOUTHWEST
N. DAK. 4
S. DAK. 1
NEB. 6
KANSAS 7
MINN. 50
IOWA 29
MO. 7
104
PLAINS
WIS. 33
MICH. 34
OHIO 21
IND. 50
ILL. 40
178
GREAT LAKES
KY. 7
TENN. 2
ARK. 2
MISS. 2
ALA. 3
LA. 4
W. VA. 0
VA. 2
N.C. 8
S.C. 1
GA. 1
FLA. 8
40
SOUTHEAST
N.Y. 4
PA. 2
17
MIDEAST
N.J. 2
DEL. 0
MD. 9
D.C. 0
ME. 0
VT. 0
2
NEW ENGLAND
N.H. 1
MASS. 0
R.I. 0
CONN. 1

INMIGRATION

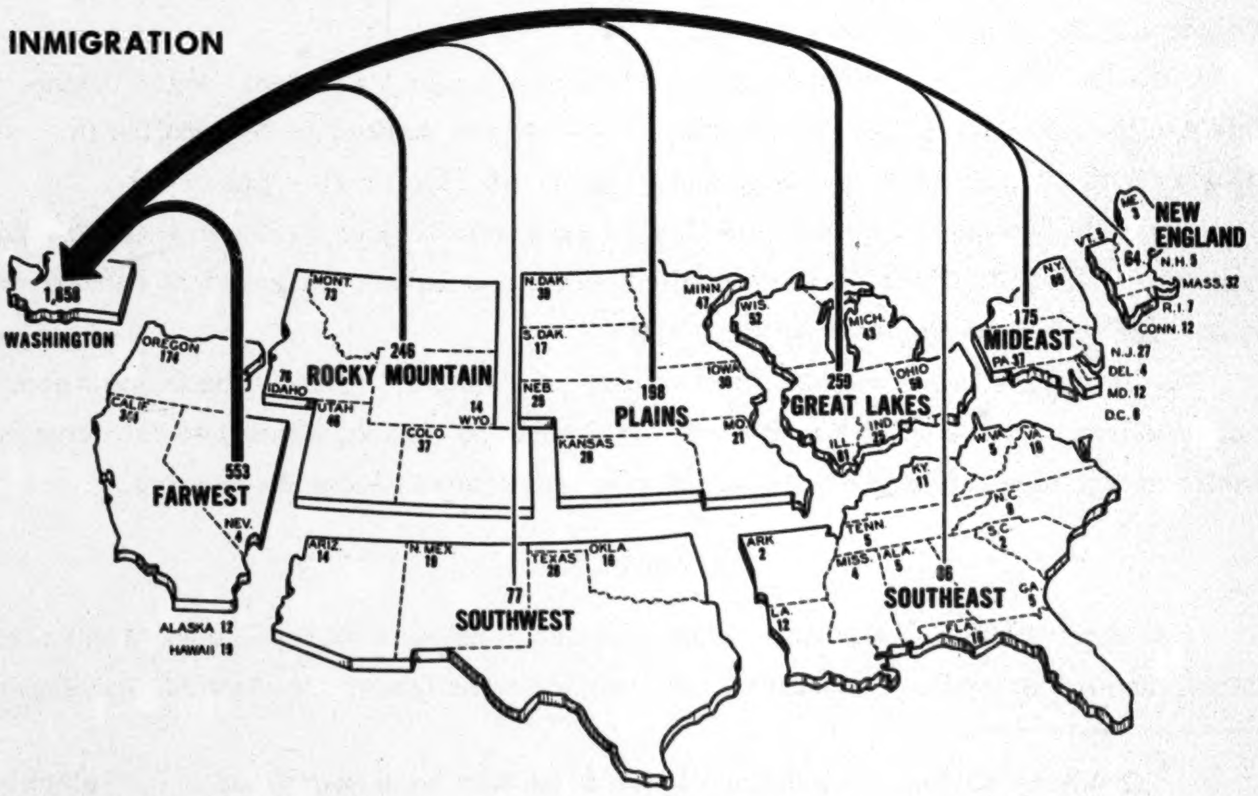

1,658
WASHINGTON
OREGON 174
CALIF. 344
NEV. 4
553
FARWEST
ALASKA 12
HAWAII 19
MONT. 73
76 IDAHO
UTAH 46
14 WYO
COLO. 37
246
ROCKY MOUNTAIN
ARIZ. 14
N. MEX. 19
TEXAS 28
OKLA. 16
77
SOUTHWEST
N. DAK. 30
S. DAK. 17
NEB. 25
KANSAS 28
MINN. 47
IOWA 30
MO. 21
198
PLAINS
WIS. 52
MICH. 43
OHIO 50
IND. 33
ILL. 81
259
GREAT LAKES
KY. 11
TENN. 5
ARK. 2
MISS. 4
ALA. 5
LA. 12
W. VA. 5
VA. 10
N.C. 8
S.C. 2
GA. 5
FLA. 18
86
SOUTHEAST
N.Y. 89
PA. 37
175
MIDEAST
N.J. 27
DEL. 4
MD. 12
D.C. 6
ME. 3
VT. 5
64
NEW ENGLAND
N.H. 5
MASS. 32
R.I. 7
CONN. 12

Figure 3:1

TABLE 3:I

Net Migration of Graduate Students
Public Institutions by Region and State
Washington: 1963

Region and State	Net Migration	Region and State	Net Migration
Total	810	Southeast	46
		Alabama	2
New England	62	Arkansas	0
Connecticut	11	Florida	8
Maine	3	Georgia	4
Massachusetts	32	Kentucky	4
New Hampshire	4	Louisiana	4
Rhode Island	7	Mississippi	2
Vermont	5	North Carolina	1
		South Carolina	1
Mideast	158	Tennessee	3
Delaware	4	Virginia	8
District of Columbia	6	West Virginia	5
Maryland	3		
New Jersey	25	Southwest	27
New York	85	Arizona	- 5
Pennsylvania	35	New Mexico	4
		Oklahoma	8
Great Lakes	81	Texas	20
Illinois	41		
Indiana	- 25	Rocky Mountain	152
Michigan	9	Colorado	2
Ohio	37	Idaho	51
Wisconsin	19	Montana	64
		Utah	31
Plains	94	Wyoming	4
Iowa	1		
Kansas	21	Far West	190
Minnesota	- 3	Alaska	12
Missouri	14	California	134
Nebraska	19	Hawaii	1
North Dakota	26	Nevada	0
South Dakota	16	Oregon	43

is represented among the ten states which have the highest percentage of nonresidents enrolled in public graduate schools. Of the 1,658 graduate student inmigrants, the largest number, 553, or 33.4 per cent, came from states within the Far West region (Figure 3:1). There were 344, or 20.7 per cent, from California and 174, or 10.5 per cent, from Oregon.

Washington draws a much larger proportion of graduate students than undergraduate students from states outside the Far West region. Approximately two-thirds (66.6 per cent) of the inmigrant graduate enrollment came from states outside the region, whereas the comparable percentage at the undergraduate level is 42.5 per cent.

Graduate students from the Great Lakes region represent the second largest number of inmigrants with 259, or 15.6 per cent. Three states in the Great Lakes region, Illinois (81), Ohio (58), and Wisconsin (52) are among the ten states in the nation which have the largest number of graduate students enrolled in Washington.

The Rocky Mountain states contributed 246, or 14.8 per cent, of the inmigrants. Of the five states in the Rocky Mountains, Idaho (76) and Montana (73) have the largest number of graduate students enrolled in Washington.

Inmigrants from the Plains region (198) and Mideast region (175) represent 11.9 per cent and 10.6 per cent, respectively, of the total number of graduate student inmigrants attending public institutions. There is notably little movement of graduate students to Washington from the two southern regions and the most distant region, New England.

Net Migration

Washington indicated a total net migration gain of 810 graduate students who attended public institutions in 1963 (Table 3:I). It is especially noteworthy that Washington had a net migration gain from all of the eight regions in the United States. The largest number of net migrants came from states in the Far West (190); California contributed 134 and Oregon, 43. The region with the second highest number of net migrants was the relatively distant Mideast with 158. In this region, New York (85) and Pennsylvania (35) indicated the largest net number of graduate students enrolled in public institutions in Washington. Washington received the third largest net gain from the Rocky Mountain region (152). Montana (64) and Idaho (51) were the two states within the Rocky Mountain region with the largest net number of graduate students registered at public colleges and universities in Washington. There were less than 100 net migrants from each of the remaining regions -- New England, Great Lakes, Plains, Southeast, and Southwest.

In summary, the net migration of graduate students to Washington who attended public institutions is particularly notable, since Washington showed a net gain from all eight regions, a pattern which is not present for any other academic category or type of institutional control.

CHAPTER 4

MIGRATION OF UNDERGRADUATE STUDENTS PRIVATE INSTITUTIONS

Outmigration

In 1963, Washington had 16,543 resident students enrolled in private institutions at the undergraduate level. Of this number, 4,793, were enrolled in institutions outside the State. The corresponding rate (29.0) approximated the national mean outmigration rate of 31.8 for 1963.

The distribution of outmigrants by region and state as shown in Figure 4:1 indicates that nearly one-half, 2,356 of the total of 4,793 undergraduate outmigrants attending private institutions are enrolled in the Far West region. This represents 49.0 per cent of the total undergraduate outmigrants from Washington enrolled in private colleges and universities.

Undergraduate student migrants from Washington enrolled in private institutions in the Rocky Mountain region represent the second largest number to any regional division. Utah (477), Idaho (216), and Colorado (103) attracted the largest number of the 817, or 17.0 per cent, undergraduate outmigrants from Washington who attended private schools in the Rocky Mountain region.

Relatively large numbers of outmigrants also are enrolled in the Great Lakes region, 463, or 9.7 per cent; New England region, 337, or 7.0 per cent; and Mideast region, 311, or 6.5 per cent.

Of the five states in the Great Lakes region, Illinois (179), Indiana (86), and Michigan (83) attracted the largest number of students from Washington. New York (147) in the Mideast region, and Massachusetts (213) in the New England region, accounted for a substantial number of Washington residents enrolled in institutions in these two regions. There was little undergraduate student movement from Washington to private institutions in the Southeast (100) and Southwest (98) regions.

Inmigration

Of the 16,338 undergraduate students enrolled in private institutions in the state of Washington, 4,588, or 28.1 per cent, were reported as nonresidents (Figure 4:1).

MIGRATION STREAMS - UNDERGRADUATE STUDENTS PRIVATE INSTITUTIONS, WASHINGTON: 1963

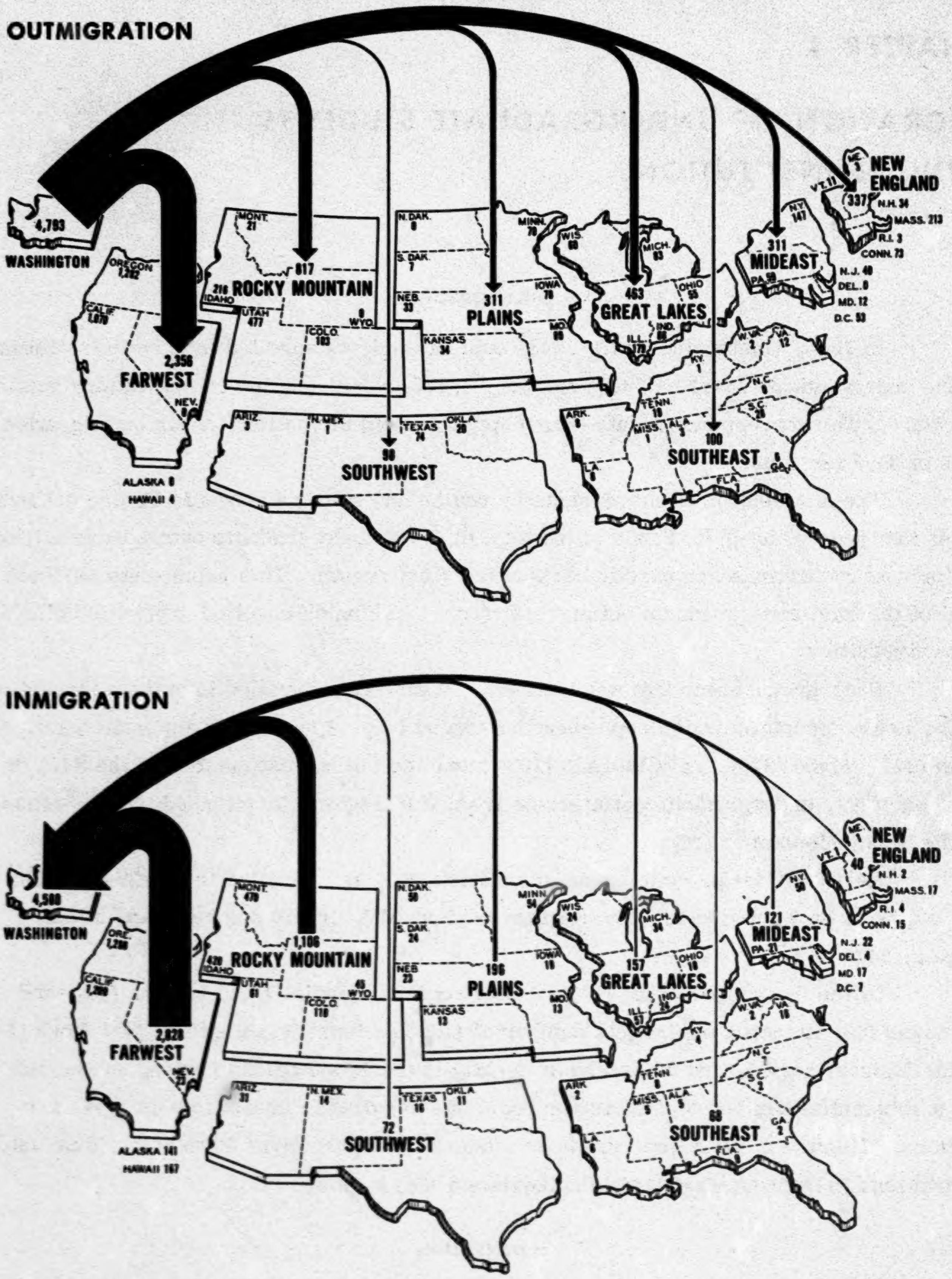

OUTMIGRATION
4,793
WASHINGTON
OREGON 1,282
CALIF. 1,070
2,356
FARWEST
NEV. 0
ALASKA 0
HAWAII 4
MONT. 21
817
216 ROCKY MOUNTAIN
IDAHO
UTAH 477
0 WYO.
COLO. 103
N. DAK. 0
S. DAK. 7
NEB. 33
311
PLAINS
KANSAS 34
MINN. 70
IOWA 78
MO. 89
ARIZ. 3
N. MEX. 1
TEXAS 74
OKLA. 20
98
SOUTHWEST
WIS. 60
MICH. 83
463
GREAT LAKES
OHIO 55
IND. 86
ILL. 179
N.Y. 147
311
MIDEAST
PA. 59
N.J. 40
DEL. 0
MD. 12
D.C. 53
ME. 3
VT. 11
NEW ENGLAND
337
N.H. 34
MASS. 213
R.I. 3
CONN. 73
W. VA. 2
VA. 12
KY. 1
N.C. 9
TENN. 18
S.C. 20
ARK. 8
MISS. 1
ALA. 3
100
SOUTHEAST
6 GA.
LA. 6
FLA. 1
INMIGRATION
4,500
WASHINGTON
ORE. 1,288
CALIF. 1,209
2,828
FARWEST
NEV. 23
ALASKA 141
HAWAII 167
MONT. 470
1,106
420 ROCKY MOUNTAIN
IDAHO
UTAH 61
45 WYO.
COLO. 110
N. DAK. 50
S. DAK. 24
NEB. 23
196
PLAINS
KANSAS 13
MINN. 54
IOWA 18
MO. 13
ARIZ. 31
N. MEX. 14
TEXAS 16
OKLA. 11
72
SOUTHWEST
WIS. 24
MICH. 34
157
GREAT LAKES
OHIO 18
IND 24
ILL. 57
NY 50
121
MIDEAST
PA. 21
N.J. 22
DEL. 4
MD 17
D.C. 7
ME. 1
VT. 1
NEW ENGLAND
40
N.H. 2
MASS. 17
R.I. 4
CONN. 15
W. VA. 2
VA. 16
KY. 4
N.C. 7
TENN. 8
S.C. 2
ARK. 2
MISS. 5
ALA. 5
68
SOUTHEAST
GA. 2
LA. 6
FLA. 9

Figure 4:1

Nearly two-thirds of all the states in the nation had higher inmigration ratios than Washington.

The 2,828 inmigrants from states within the Far West region represent 61.6 per cent of the total of inmigrants. The 1,288, or 28.1 per cent, inmigrants from Oregon and the 1,209, or 26.4 per cent, inmigrants from California account for over one-half of the nonresident students enrolled in private institutions at the undergraduate level.

There was also a large number of inmigrants, 1,106, from the Rocky Mountain region. Four states in the Rocky Mountain region -- Montana (470), Idaho (420), Colorado (110), and Utah (61) -- were represented among the states which sent the largest number of migrants to Washington.

The 2,828 inmigrants from the Far West region and the 1,106 from the Rocky Mountain region comprise 85.7 per cent of the nonresident undergraduate enrollment in private colleges and universities in Washington. The 196, or 4.3 per cent, inmigrants from the Plains region, the 157, or 3.4 per cent, from the Great Lakes region, and the 121, or 2.6 per cent, from the Mideast region, accounted for only a small proportion in this category.

Net Migration

Washington reported a total net migration loss of 205 undergraduate students attending private institutions. Washington had a net outmigration to six of the eight regions. Although relatively distant from Washington, the Great Lakes region with 306 had the highest number of net migrants from Washington. Illinois (122) and Indiana (62) were the two states in the Great Lakes region with the largest gain in net migrants. The most distant region from Washington, New England, reported the second largest number of net migrants with 297. Of the six states composing this region, Massachusetts (196) and Connecticut (58) showed the largest net gains from Washington. The Mideast region ranked third highest with a net gain of 190. In this region, New York indicated the largest net number with 97 migrants from Washington. The Plains region ranked fourth with a net migration gain of 115 students. The other two regions which showed net gains were Southeast with 32, and Southwest with 26.

Washington had a net gain of undergraduate students enrolled in private institutions from two regions, the Far West (472) and Rocky Mountain (289). Hawaii (163), Alaska (141), and California (139) were the three states in the Far West region which sent the largest numbers of net migrants to Washington. In the Rocky Mountain region, Montana (449), Idaho (204), and Wyoming (45) reported the largest numbers of net undergraduates enrolled in private institutions in Washington.

Although Washington had a net student gain from the Far West and Rocky Mountain regions, the large net outmigration to the six other regions resulted in a total net loss of undergraduates enrolled in private institutions. This pattern is in contrast to that described previously for undergraduates enrolled in public institutions.

TABLE 4:I

Net Migration of Undergraduate Students Private Institutions by Region and State Washington: 1963

Region and State	Net Migration	Region and State	Net Migration
Total	-205	Southeast	- 32
New England	-297	Alabama	2
Connecticut	- 58	Arkansas	- 6
Maine	- 2	Florida	2
Massachusetts	-196	Georgia	- 4
New Hampshire	- 32	Kentucky	3
Rhode Island	1	Louisiana	- 2
Vermont	- 10	Mississippi	4
Mideast	-190	North Carolina	2
Delaware	4	South Carolina	- 26
District of Columbia	- 46	Tennessee	- 11
Maryland	5	Virginia	4
New Jersey	- 18	West Virginia	0
New York	- 97	Southwest	- 26
Pennsylvania	- 38	Arizona	28
Great Lakes	-306	New Mexico	13
Illinois	-122	Oklahoma	- 9
Indiana	- 62	Texas	- 58
Michigan	- 49	Rocky Mountain	289
Ohio	- 37	Colorado	7
Wisconsin	- 36	Idaho	204
Plains	-115	Montana	449
Iowa	- 59	Utah	-416
Kansas	- 21	Wyoming	45
Minnesota	- 16	Far West	472
Missouri	- 76	Alaska	141
Nebraska	- 10	California	139
North Dakota	50	Hawaii	163
South Dakota	17	Nevada	23
		Oregon	6

CHAPTER 5

MIGRATION OF GRADUATE STUDENTS PRIVATE INSTITUTIONS

Outmigration

At the graduate level, 602 students who reported Washington as their state of permanent residence were enrolled in private institutions located in 26 other states throughout the country (Figure 5:1). This represents an outmigration rate of 35.0. For the nation as a whole, approximately two-thirds of all the states reported an outmigration rate of 40.0 or more. Thus, Washington was represented among the 18 remaining states with outmigration rates of less than 40.0.

The pattern of outmigration for graduate students attending private institutions, as shown in Figure 5:1, exhibits a noticeable concentration of Washington residents enrolled in private institutions in the Mideast region. It will be observed that 225, or 37.4 per cent, of the graduate student outmigrants are enrolled in private institutions in this region. The District of Columbia with 94, or 15.6 per cent, and New York with 92, or 15.3 per cent, ranked second and third, respectively, in the number of students from Washington.

The second largest number of outmigrants, 170, or 28.2 per cent, are enrolled in private institutions located in the Far West region. California and Oregon reported 113 and 57 graduate students, respectively. California ranked first among the states according to number of outmigrant graduate students enrolled in private institutions.

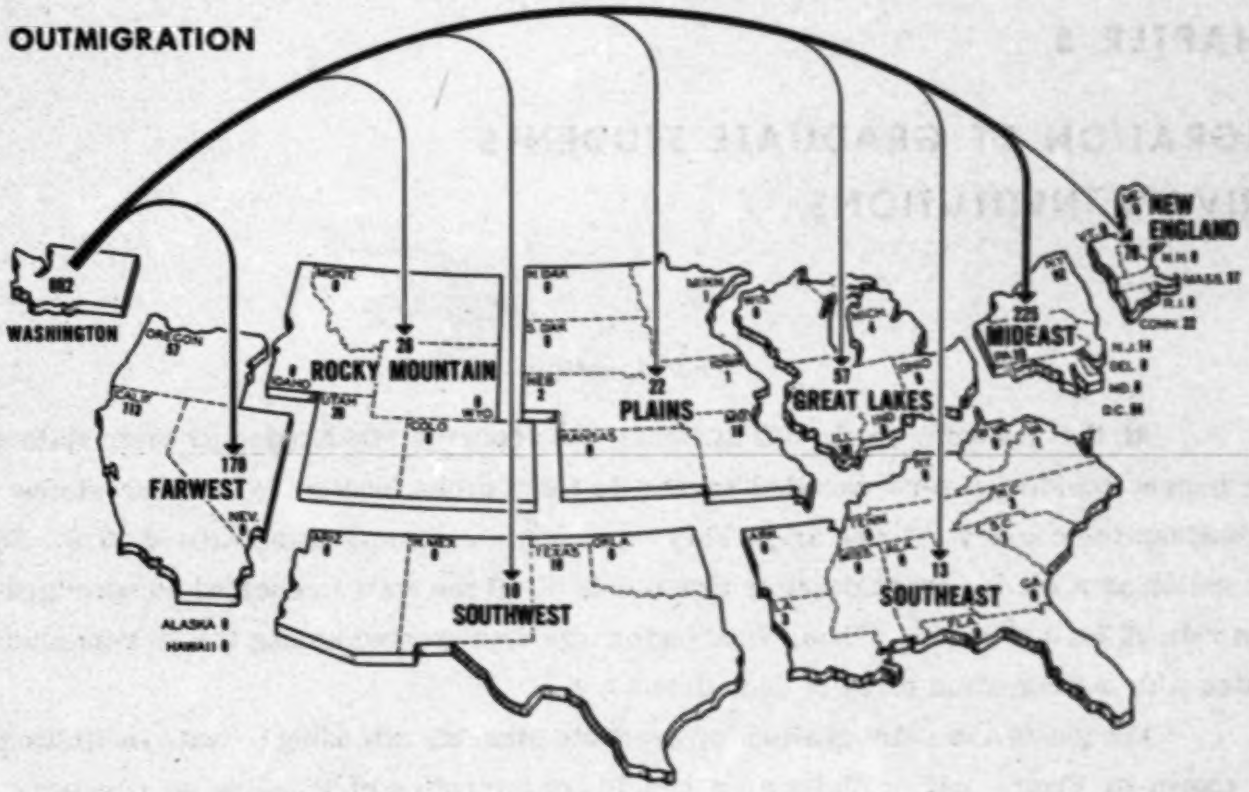
The New England region with 79, or 13.1 per cent, and the Great Lakes region with 57, or 9.5 per cent, attracted the third and fourth largest number of outmigrants. In New England, Massachusetts (57) and Connecticut (22) were represented among the ten states which enrolled the largest number of graduate students in private institutions from Washington. Less than 30 outmigrants were enrolled in each of the remaining regions: Rocky Mountain, Plains, Southeast, and Southwest.

Inmigration

Of the 1,172 graduate students enrolled in private institutions in Washington, only 56, or 4.8 per cent, were reported as nonresidents. On a nation-wide basis, Washington

MIGRATION STREAMS - GRADUATE STUDENTS
PRIVATE INSTITUTIONS, WASHINGTON: 1963

OUTMIGRATION


WASHINGTON
802
170
FARWEST
OREGON 57
CALIF 112
NEV.
ALASKA 0
HAWAII 0
26
ROCKY MOUNTAIN
MONT. 0
IDAHO
UTAH 26
WYO 0
COLO 0
22
PLAINS
N DAK 0
S DAK 0
NEB 2
KANSAS 0
MINN 1
IOWA 1
MO 18
10
SOUTHWEST
ARIZ 0
N MEX 0
TEXAS 10
OKLA 0
57
GREAT LAKES
MICH 4
225
MIDEAST
N.J. 14
DEL. 0
MD. 0
NEW ENGLAND
78
N.H. 0
MASS. 57
R.I. 0
CONN. 22
13
SOUTHEAST

INMIGRATION

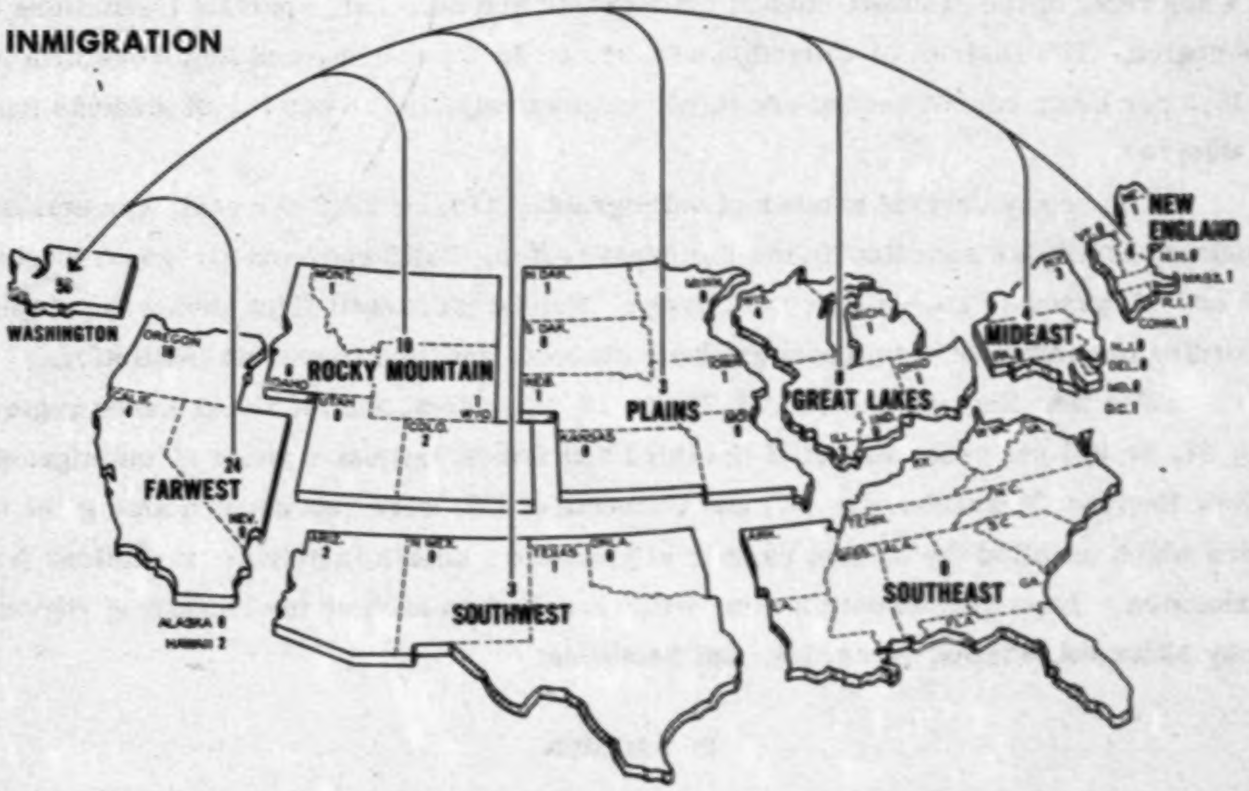

WASHINGTON
56
24
FARWEST
OREGON 18
CALIF 4
NEV.
ALASKA 0
HAWAII 2
10
ROCKY MOUNTAIN
MONT. 1
IDAHO
UTAH 0
WYO 1
COLO 2
3
PLAINS
N DAK 1
S DAK 0
NEB 1
KANSAS 0
3
SOUTHWEST
ARIZ 2
N MEX 0
TEXAS 1
OKLA 0
8
GREAT LAKES
4
MIDEAST
N.Y. 3
NEW ENGLAND
4
N.H. 0
MASS. 1
R.I. 1
CONN. 1
N.J. 0
DEL. 0
MD. 0
D.C. 1
0
SOUTHEAST

Figure 5:1

TABLE 5:I

Net Migration of Graduate Students
Private Institutions by Region and State
Washington: 1963

Region and State	Net Migration
Total	-546
New England	- 75
Connecticut	- 21
Maine	1
Massachusetts	- 56
New Hampshire	0
Rhode Island	1
Vermont	0
Mideast	-221
Delaware	0
District of Columbia	- 93
Maryland	- 6
New Jersey	- 14
New York	- 89
Pennsylvania	- 19
Great Lakes	- 49
Illinois	- 28
Indiana	- 8
Michigan	- 3
Ohio	- 8
Wisconsin	- 2
Plains	- 19
Iowa	0
Kansas	0
Minnesota	- 1
Missouri	- 18
Nebraska	- 1
North Dakota	1
South Dakota	0
Southeast	- 13
Alabama	0
Arkansas	0
Florida	0
Georgia	0
Kentucky	0
Louisiana	- 3
Mississippi	0
North Carolina	- 3
South Carolina	- 1
Tennessee	- 5
Virginia	- 1
West Virginia	0
Southwest	- 7
Arizona	2
New Mexico	0
Oklahoma	0
Texas	- 9
Rocky Mountain	- 16
Colorado	- 4
Idaho	6
Montana	1
Utah	- 20
Wyoming	1
Far West	-146
Alaska	0
California	-109
Hawaii	2
Nevada	0
Oregon	- 39

is represented among the six states in which inmigrants comprised less than ten per cent of the graduate enrollment in private institutions.

Of the 56 inmigrants, the largest number, 24, came from states within the Far West region. Of the states in the Far West region, Oregon, with 18, had the largest number of graduate students enrolled in private colleges and universities in Washington.

Net Migration

Washington reported a total net migration loss of 546 graduate students enrolled in private institutions (Table 5:I). The most notable pattern is that Washington had a net loss to all of the eight regions in the United States. Although relatively distant from Washington, the Mideast region indicated the largest number of net migrants from Washington, with 221. Of the six states in this region, the District of Columbia with 93, and New York with 89, had the largest number of net migrants. The region which reported the second largest net gain from Washington was the Far West with 146. California (109) and Oregon (39) were the two states which showed the largest net number of migrants. New England had a net migration gain of 75 students from Washington. Each of the five other regions, Great Lakes (49), Plains (19), Rocky Mountain (16), Southeast (13), and Southwest (7) had a net gain of less than 50 students from Washington.

In summary, the net migration of graduate students enrolled in private institutions is notable in that Washington displayed a net loss to all eight regions, a pattern which was in direct contrast to that previously described for graduate students enrolled in public institutions.

CHAPTER 6

MIGRATION OF FIRST PROFESSIONAL DEGREE STUDENTS PUBLIC AND PRIVATE INSTITUTIONS[1]

Outmigration

In 1963, of the 1,872 Washington residents enrolled in first professional degree programs, 789 attended public and private institutions outside the State. This corresponds to an outmigration rate of 42.1. However, 26 of the 50 states also reported outmigration rates of 40.0 or higher.

The largest number of outmigrants, 281, or 35.6 per cent, remained within the Far West region. The students enrolled in California, 179, or 22.7 per cent, and Oregon, 102, or 12.9 per cent, represent a large percentage of the total of 789 outmigrants.

The second largest number of outmigrants, 121, was enrolled in the Great Lakes region. Three of the states in the Great Lakes region, Illinois (56), Wisconsin (25), and Michigan (25), were represented among the ten states in the nation which received the largest number of migrants from Washington.

Washington sent 101 outmigrants to the Mideast region and 100 to the Plains region. Missouri received the largest number of migrants (44) in the Plains region, and New York with 33 and the District of Columbia with 24 in the Mideast.

Other states which had a substantial number of first professional degree student migrants from Washington were Massachusetts (52) in the New England region, and Texas (35) in the Southwest region. However, these regions as a whole reported comparatively few migrants from Washington.

Inmigration

There were 1,416 first professional degree students enrolled in programs in the state of Washington. Of this number, 333, or 23.5 per cent, were nonresidents of Washington (Figure 6:1). Almost one-half of the states (23) reported a higher percentage of nonresident first professional degree students. There was only one state (Oregon) in

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[1] First professional degree students are defined as students enrolled in work creditable toward a first professional degree in professional schools or programs (such as law, medicine, or dentistry, etc.) which require previous college work for admission.

MIGRATION STREAMS - FIRST PROFESSIONAL DEGREE STUDENTS
PUBLIC AND PRIVATE INSTITUTIONS, WASHINGTON: 1963

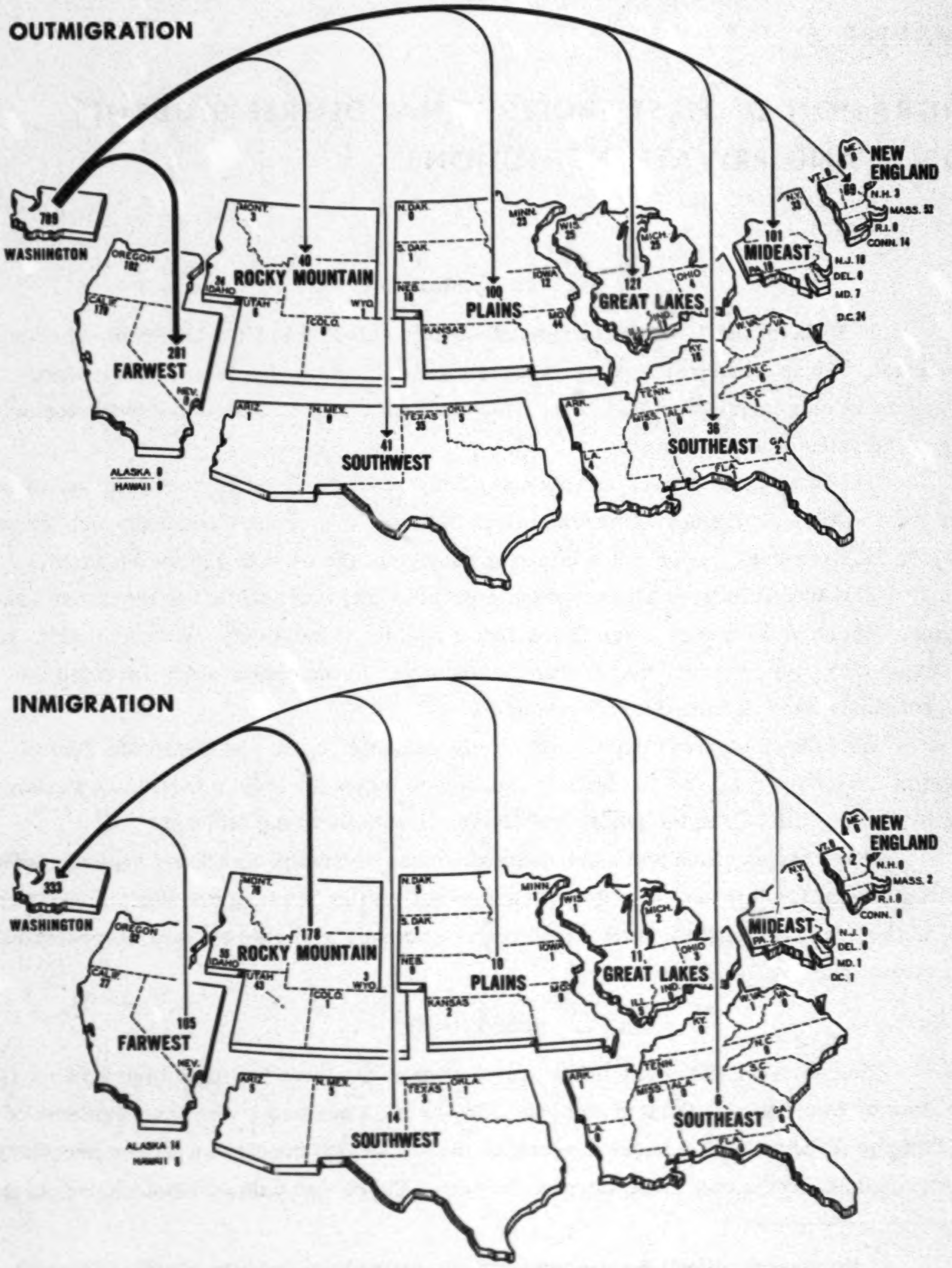
OUTMIGRATION
WASHINGTON 789
FARWEST 281
OREGON 102
CALIF. 179
NEV. 0
ALASKA 0
HAWAII 0
ROCKY MOUNTAIN 40
MONT. 3
IDAHO 24
UTAH 6
WYO. 1
COLO. 6
SOUTHWEST 41
ARIZ. 1
N. MEX. 0
TEXAS 35
OKLA. 5
PLAINS 100
N. DAK. 8
S. DAK. 1
NEB. 10
MINN. 23
IOWA 12
KANSAS 2
MO. 44
GREAT LAKES 121
WIS. 25
MICH. 25
OHIO 4
IND. 11
ILL. 56
SOUTHEAST 36
ARK. 0
LA. 4
MISS. 0
ALA. 0
TENN. 1
KY. 15
W. VA. 1
VA. 4
N.C. 8
S.C. 1
GA. 2
FLA. 0
MIDEAST 101
N.Y. 33
PA. 18
N.J. 10
DEL. 0
MD. 7
D.C. 24
NEW ENGLAND 69
ME. 0
VT. 0
N.H. 3
MASS. 52
R.I. 0
CONN. 14
INMIGRATION
WASHINGTON 333
FARWEST 105
OREGON 32
CALIF. 27
NEV. 7
ALASKA 14
HAWAII 5
ROCKY MOUNTAIN 178
MONT. 76
IDAHO 55
UTAH 43
WYO. 3
COLO. 1
SOUTHWEST 14
ARIZ. 5
N. MEX. 5
TEXAS 3
OKLA. 1
PLAINS 10
N. DAK. 5
S. DAK. 1
NEB. 0
MINN. 1
IOWA 1
KANSAS 2
MO. 0
GREAT LAKES 11
WIS. 1
MICH. 2
OHIO 3
IND. 0
ILL. 5
SOUTHEAST 6
ARK. 1
LA. 0
MISS. 0
ALA. 0
TENN. 0
KY. 0
W. VA. 1
VA. 0
N.C. 0
S.C. 4
GA. 0
FLA. 0
MIDEAST 7
N.Y. 3
PA. 2
N.J. 0
DEL. 0
MD. 1
DC. 1
NEW ENGLAND 2
ME. 0
VT. 0
N.H. 0
MASS. 2
R.I. 0
CONN. 0

Figure 6:1

TABLE 6:I

Net Migration of First Professional Degree Students
Public and Private Institutions by Region and State
Washington: 1963

Region and State	Net Migration
Total	-456
New England	- 67
Connecticut	- 14
Maine	0
Massachusetts	- 50
New Hampshire	- 3
Rhode Island	0
Vermont	0
Mideast	- 94
Delaware	0
District of Columbia	- 23
Maryland	- 6
New Jersey	- 18
New York	- 30
Pennsylvania	- 17
Great Lakes	-110
Illinois	- 51
Indiana	- 11
Michigan	- 23
Ohio	- 1
Wisconsin	- 24
Plains	- 90
Iowa	- 11
Kansas	0
Minnesota	- 22
Missouri	- 44
Nebraska	- 18
North Dakota	5
South Dakota	0
Southeast	- 30
Alabama	0
Arkansas	1
Florida	- 1
Georgia	- 2
Kentucky	- 16
Louisiana	- 4
Mississippi	0
North Carolina	- 6
South Carolina	3
Tennessee	- 1
Virginia	- 4
West Virginia	0
Southwest	- 27
Arizona	4
New Mexico	5
Oklahoma	- 4
Texas	- 32
Rocky Mountain	138
Colorado	- 5
Idaho	31
Montana	73
Utah	37
Wyoming	2
Far West	-176
Alaska	14
California	-152
Hawaii	5
Nevada	7
Oregon	- 50

the Far West region which had a higher percentage of inmigrants than Washington. Nonresident students comprised 30.8 per cent of the first professional degree enrollment in Oregon.

It may be observed from Figure 6:1 that the 178 students from the Rocky Mountain region represented more than one-half, 53.5 per cent, of the total of 333 inmigrants.

There were relatively large numbers of inmigrants from three states in the Rocky Mountain region: Montana (76), Idaho (55), and Utah (43).

Other states in the Far West region also contributed large numbers of inmigrants. Of the 105 inmigrants from the Far West region, the largest number came from Oregon (52) and California (27).

Inmigrants from both the Rocky Mountain and Far West regions represented 85.0 per cent of the total of 333 nonresidents enrolled in first professional degree programs. The number of inmigrants from the other six regional divisions was comparatively small.

Net Migration

Washington reported a net migration loss of 456 first professional degree students enrolled in public and private institutions. A notable fact is that Washington had a net student loss to seven of the eight regions in the United States. Washington had the largest net migration loss to the Far West region with 176. California (152) and Oregon (50) were the two states of this region which had the largest net migration gain from Washington.

The second largest net loss of migrants was to the Great Lakes region with 110. In this region, the largest number of net outmigrants was enrolled in Illinois (51) and Wisconsin (24). Washington showed a net loss of less than 100 students to each of the remaining regions -- New England, Mideast, Plains, Southeast, and Southwest.

Washington reported a net student gain (138) from only one region, the Rocky Mountain. The largest number of net migrants came from Montana (73), Utah (37), and Idaho (31).

In summary, Washington reported a net migration loss of 456 first professional degree students to seven of the eight regions. The Rocky Mountain region was the only region which had a net loss of students to Washington. This pattern of net migration for first professional degree students is similar to that previously described for both graduate and undergraduate students enrolled in private colleges and universities, and is in contrast to that indicated for graduate and undergraduate students enrolled in public institutions.

CHAPTER 7

MIGRATION TO SPECIFIC INSTITUTIONS OF HIGHER EDUCATION

The preceding chapters have been devoted to a presentation of general streams of interstate college student migration. In this chapter, the emphasis is on inmigration to specific institutions within Washington. This discussion will be organized under three separate headings: (1) public colleges and universities, (2) private colleges and universities, and (3) community colleges.

Migration to Four-Year Public Colleges and Universities

There were 4,539 nonresident students enrolled in 1963 in the five public four-year colleges and universities in Washington. The distribution of inmigrants was as follows: University of Washington, 3,077; Washington State University, 1,041; Western Washington State College, 196; Central Washington State College, 82; and Eastern Washington State College, 143 (Table 7:I).

Of the 3,077 nonresident students enrolled at the University of Washington, the largest number came from states in the Far West (1,436) and Rocky Mountain (458) regions. Individual states contributing the largest number of students were: California (823), Oregon (382), Montana (165), Hawaii (143), and Idaho (142).

The 3,077 nonresidents attending the University of Washington consisted of 1,675 undergraduate students, 1,240 graduate students, and 162 first professional degree students. These numbers represented 10.5 per cent, 37.3 per cent, and 18.5 per cent, respectively, of the total enrollment in each of these categories. At the undergraduate level in the University of Washington, the largest number of inmigrants were residents of the Far West (949) and Rocky Mountain (233) regions. Nonresident graduate migrants came predominantly from the Far West (440), Great Lakes (205), and Mideast (151) regions.

Washington State University ranked second in nonresident student enrollment (1,041). This number represented 13.0 per cent of the total enrollment at Washington State University. Similar to the pattern for the University of Washington, the largest number of migrants came from the Far West (421) and the Rocky Mountain (299) regions.

TABLE 7:I

Immigrant Students by Region and/or State
Major Public Institutions
Washington: 1963

Region and/or State	University of Washington				Washington State University				State Colleges*		
	Total	Under-grad.	Grad.	First Prof.	Total	Under-grad.	Grad.	First Prof.	Western	Central	Eastern
Total	3,077	1,675	1,240	162	1,041	542	399	100	196	82	143
New England	87	31	55	1	17	8	9	...	3	...	2
Mideast	265	110	151	4	52	27	24	1	5	1	4
Great Lakes	342	133	205	4	76	21	54	1	8	4	1
Plains	216	83	127	6	98	25	71	2	11	5	3
Southeast	148	77	67	4	41	22	19	...	1	4	...
Southwest	125	59	58	8	37	12	19	6	4	2	...
Rocky Mountain	458	233	137	88	299	140	101	58	14	9	87
Colorado	44	19	24	1	18	5	13	...	3	...	...
Idaho	142	87	27	28	137	78	41	18	6	7	66
Montana	165	93	49	23	103	49	24	30	4	2	21
Utah	85	23	27	35	32	5	19	8	...	...	...
Wyoming	22	11	10	1	9	3	4	2	1	...	...
Far West	1,436	949	440	47	421	287	102	32	150	57	46
Alaska	69	51	6	12	21	19	2	...	40	8	1
California	823	519	287	17	209	151	53	5	38	12	6
Hawaii	143	122	16	5	36	33	3	...	41	17	16
Oregon	382	243	129	10	141	76	42	23	31	20	23
Nevada	19	14	2	3	14	8	2	4	...	...	...

* Includes all student categories.

TABLE 7:II

Inmigrant Students by Region and/or State
Private Colleges and Universities
Washington: 1963*

Region and/or State	Seattle Univ.	Gonzaga Univ.	Walla Walla College	Pacific Lutheran Univ.	Univ. Puget Sound	Seattle Pacific College	Whit-worth College	Whitman College	St. Martin's College	North-west College	Sulpi-cian Semi-nary	Fort Wright College
Total . . .	833	781	645	504	432	395	393	383	108	106	79	56
New England . .	10	5	1	1	12	...	2	3	10	...	1	...
Mideast	40	12	15	3	30	5	4	8	9	1	...	...
Great Lakes . . .	50	24	10	8	32	16	10	9	5	1	6	...
Plains	38	17	12	44	32	26	9	7	5	7	...	4
Southeast	18	10	3	2	24	1	3	5	1	2	1	...
Southwest	24	12	7	2	13	2	9	4	2	...	...	...
Rocky Mountain .	139	279	148	107	51	52	120	107	12	50	48	35
Colorado . . .	18	9	22	3	8	8	30	14	...	...	...	...
Idaho	30	88	72	30	25	15	57	50	12	25	12	19
Montana . . .	59	153	43	71	12	23	29	32	...	21	36	15
Utah	27	16	4	1	2	...	1	10	...	...	...	...
Wyoming . . .	5	13	7	2	4	6	3	1	...	4	...	1
Far West	514	422	449	337	238	293	236	240	64	45	23	17
Alaska	33	26	9	17	23	20	4	7	3	...	...	1
California . .	257	254	89	141	86	76	176	122	13	...	1	3
Hawaii	49	22	24	7	29	7	6	13	4	2	...	6
Oregon	168	114	325	169	98	190	50	96	44	43	22	6
Nevada	7	6	2	3	2	...	...	2	...	...	...	1

* Includes all student categories.

California (209), Oregon (141), Idaho (137), and Montana (103) contributed the largest number of students. Of the total of 1,041 nonresident students enrolled in Washington State University, 542 were undergraduates and 399 were graduates. Nonresident undergraduates represented only 7.6 per cent of the total undergraduate enrollment, whereas nonresident graduate students represented 52.9 per cent of the total graduate enrollment at Washington State University. Of the 171 students enrolled in first professional degree programs, 100, or 58.5 per cent, came from other states in the nation.

Western Washington State College reported 196 nonresident students. These students represented 5.0 per cent of the total student enrollment (3,948). The largest number of nonresident students were migrants from states within the Far West region (150). Two states in the Far West region, Hawaii (41) and Alaska (40), had a comparatively large number of residents enrolled at Western Washington State College.

Central Washington State College reported 82 nonresident students. These students represented 2.6 per cent of the total student enrollment (3,155). The largest number of nonresident students were migrants from states within the Far West (57) region.

Eastern Washington State College reported 143 nonresident students. These students represented 5.1 per cent of the total student enrollment (2,811). The largest number of nonresident students were migrants from states within the Rocky Mountain (87) region. A large number of migrants from the Rocky Mountain region were residents of Idaho (66).

Migration to Private Colleges and Universities

Data on nonresident or inmigrant students who attended private institutions of higher learning in the fall of 1963 are presented in Table 7:II. There were 4,715 nonresident students enrolled in private colleges and universities in Washington in 1963. These students comprised 26.4 per cent of the total student enrollment (17,878) in private institutions. Nonresident students enrolled at Seattle University (833), Gonzaga University (781), and Walla Walla College (645) represented almost one-half, 47.9 per cent of the total nonresident enrollment in private institutions (Table 7:II).

The number and proportion of inmigrant students of the total enrollment in each of the 12 private institutions are as follows: Seattle University 833, or 21.4 per cent; Gonzaga University 781, or 36.4 per cent; Walla Walla College 645, or 47.3 per cent; Pacific Lutheran University 504, or 27.0 per cent; University of Puget Sound 432, or 14.6 per cent; Seattle Pacific College 395, or 23.9 per cent; Whitworth College 393, or 22.6 per cent; Whitman College 383, or 41.8 per cent; St. Martin's College 108, or 23.9 per cent; Northwest College 106, or 42.1 per cent; Sulpician Seminary 79, or 39.5 per cent, and Fort Wright College 56, or 12.8 per cent.

The largest number of inmigrant students came from the Far West and Rocky Mountain regions. Within the Far West, the largest number of nonresident students came from California (1,218) and Oregon (1,325). Private institutions of higher learning in

TABLE 7:III

Inmigrant Students by Region and/or State
Community Colleges
Washington: 1963*

Region and/or State	Centralia	Clark	Columbia Basin	Everett	Grays Harbor	Highline	Lower Columbia	Olympic	Peninsula	Skagit Valley	Wenatchee Valley	Yakima Valley
Total . . .	12	243	184	26	18	3	52	260	6	27	38	27
New England . . .	...	1	1	1	...	...	...	9	1	1	...	1
Mideast	1	...	11	...	2	...	...	22	1	...	2	...
Great Lakes . . .	1	3	12	5	3	...	...	34	2	1	6	...
Plains	2	4	22	1	1	...	4	38	...	...	3	2
Southeast	1	...	8	...	...	...	1	19	...	1	3	1
Southwest	...	...	11	2	...	...	...	14	1	2	1	1
Rocky Mountain .	2	1	28	5	1	2	3	34	...	1	7	4
Colorado . . .	...	...	4	1	1	1	1	9	...	...	1	...
Idaho	1	1	12	2	...	...	1	10	...	...	4	2
Montana . . .	1	...	9	2	...	1	1	9	...	1	2	1
Utah	...	...	1	...	...	...	...	4	...	...	...	...
Wyoming . . .	...	...	2	...	...	...	...	2	...	...	...	1
Far West	5	234	91	12	11	1	44	90	1	21	16	18
Alaska	1	1	...	3	...	...	1	13	1	11	2	3
California . .	1	4	8	4	4	...	4	38	...	5	6	3
Hawaii	...	2	2	1	...	...	...	2	...	1	3	2
Oregon	3	227	80	4	7	1	39	34	...	4	5	10
Nevada	...	...	1	...	...	...	...	3	...	..	...	...

* Generally, academic students are included and vocational-technical students are excluded.

Washington also attracted students from the Rocky Mountain region principally from Idaho and Montana. Seattle University and the University of Puget Sound are the only schools which attracted sizable numbers of students from other areas in the United States, especially from the Mideast, Great Lakes, and Plains regions.

Migration to Community Colleges[1]

In the fall of 1963, there were 896 nonresident students enrolled in Washington's 12 public community colleges. These students represented 5.0 per cent of the total of 17,841 students enrolled in community colleges.

Table 7:III indicates that Clark, Columbia Basin, and Olympic Community Colleges attracted a disproportionately large share of nonresident students. Nonresident enrollment at Olympic College totaled 260 students, at Clark College, 243, and at Columbia Basin College, 184. Nonresident enrollment at these three institutions represented 687, or 76.1 per cent, of all the nonresident students enrolled in community colleges.

Most of the nonresident students enrolled in community colleges came from states within the Far West region. A comparatively large number were residents of Oregon. Of the total of 243 nonresident students enrolled at Clark College, 227 came from Oregon. Almost one-half, 43.5 per cent, of the 184 nonresident students enrolled in Columbia Basin College also came from Oregon. Other community colleges that attracted a large proportion of their nonresident students from states within the Far West region were Lower Columbia College, Yakima Valley College, Everett Junior College, and Skagit Valley College. Only two community colleges, Olympic College (136) and Columbia Basin College (65), attracted a large number of students from states outside the Far West and Rocky Mountain regions.

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[1] In the state of Washington, it now is customary to refer to the two-year colleges as community colleges rather than junior colleges. The enrollment statistics presented in this section generally include "academic" (degree-credit) students and exclude "vocational" or "technical" students. However, the definition of "academic" students, as used by the various community colleges, does not seem to be followed with rigorous consistency. Furthermore, in the 1963 survey of student migration, Spokane and Big Bend Community Colleges were not included.

CHAPTER 8

MIGRATION TRENDS: 1938 TO 1963

This chapter is devoted to a discussion of trends in college student migration from 1938 to 1963. First, consideration will be given to migration trends of all students enrolled in all institutions during this period of time. Second, patterns and trends of migration for private and public institutions will be examined. Finally, an analysis of differentials and trends of migration for undergraduate and graduate students will be presented. For each of the student-institutional categories, measures of outmigration, inmigration, and net migration will be examined.

All Students in Public and Private Institutions

Outmigration. Figure 8:1 portrays the number of outmigrant students from Washington between 1938 and 1963 enrolled in public and private institutions of higher learning in eight regional areas of the United States. The total number of outmigrants during this period increased from 2,610 to 9,586, while the total number of resident students increased from 23,644 to 73,262. Thus, outmigrants as a proportion of all resident students of the state of Washington, increased between 1938 and 1963. In 1938, the rate was 11.0, while in 1963, it was 13.1.

The pattern of migration of Washington college and university students to regional areas in the United States has been relatively uniform since 1938. Between 43.0 and 50.3 per cent of the college and university students in this state have continued to choose institutions of higher learning in the Far West region. Between 13 6 and 18.1 per cent have sought a college education in the Rocky Mountain region. Viewed as contiguous areas, both the Far West and Rocky Mountain regions have continued to attract more than 50.0 per cent of Washington's college migrants. There has been a proportionate increase since 1949. In 1963, 63.7 per cent of Washington's outmigrants attended schools in these two regions. Prior to 1949, the comparable figure was 56.6 per cent. The Rocky Mountain region absorbed most of this gain. Since 1958, it is the only region in the United States where college migrants from Washington have registered a substantially steady proportionate increase. In 1963, seven of every ten Washington students who migrated to this region attended school in Idaho and Utah (Table 8:I).

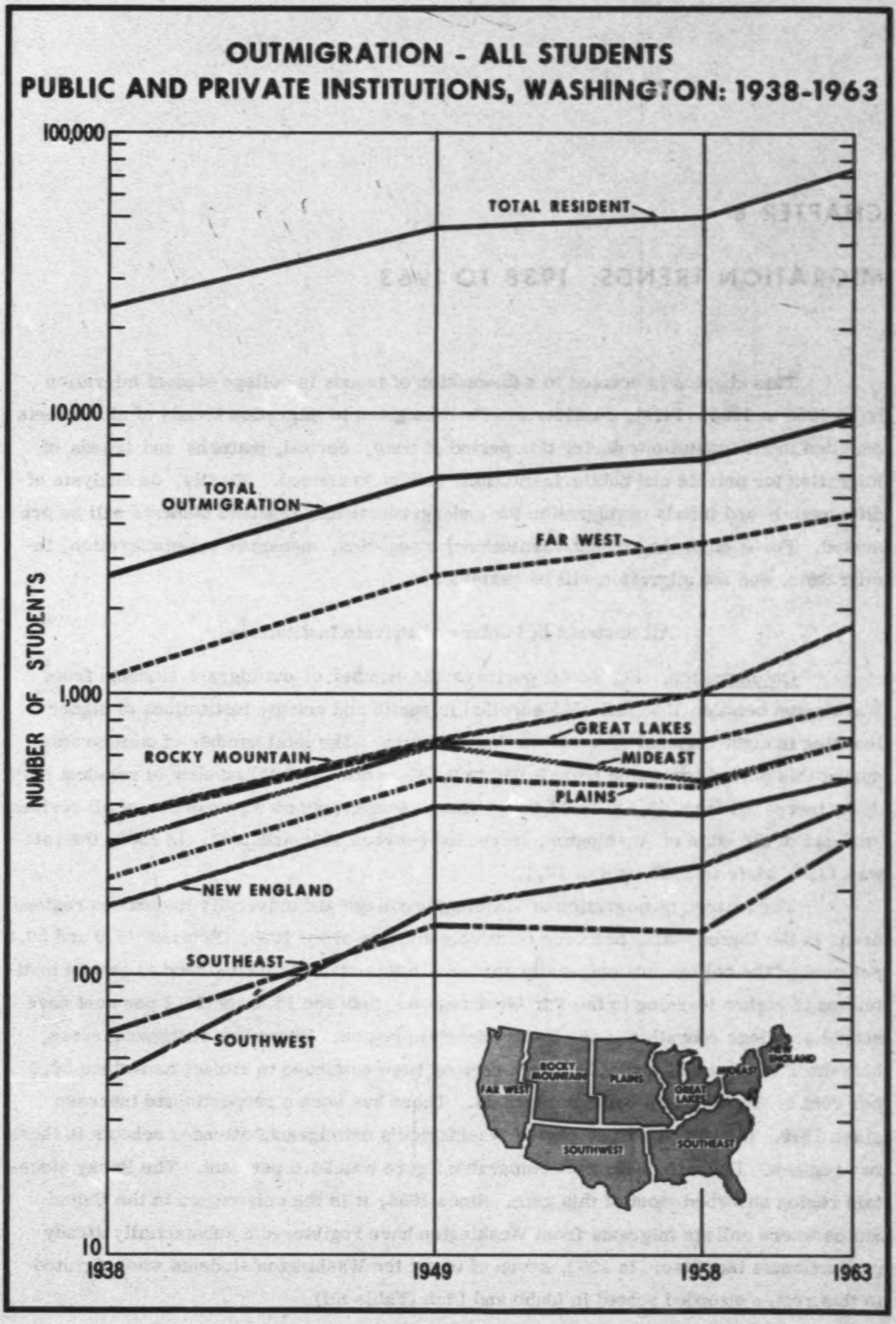
OUTMIGRATION - ALL STUDENTS
PUBLIC AND PRIVATE INSTITUTIONS, WASHINGTON: 1938-1963
NUMBER OF STUDENTS
100,000
10,000
1,000
100
10
1938
1949
1958
1963
TOTAL RESIDENT
TOTAL OUTMIGRATION
FAR WEST
GREAT LAKES
ROCKY MOUNTAIN
MIDEAST
PLAINS
NEW ENGLAND
SOUTHEAST
SOUTHWEST
FAR WEST
ROCKY MOUNTAIN
PLAINS
GREAT LAKES
MIDEAST
NEW ENGLAND
SOUTHWEST
SOUTHEAST

Figure 8:1

TABLE 8:I

Migration of All Students
Public and Private Institutions by Region
Washington: 1949, 1958, and 1963

Region and Year	Outmigration			Inmigration			Net Migration		
	Total	Public	Private	Total	Public	Private	Total	Public	Private
1963									
Total . . .	9,586	3,543	6,043	9,397	4,994	4,403	- 189	1,451	-1,640
New England . .	493	9	484	169	124	45	- 324	115	- 439
Mideast	682	51	631	493	366	127	- 189	315	- 504
Great Lakes . .	915	286	629	669	498	171	- 246	212	- 458
Plains	683	260	423	611	410	201	- 72	150	- 222
Southeast	303	163	140	298	228	70	- 5	65	- 70
Southwest . . .	403	256	147	275	200	75	- 128	- 56	- 72
Rocky Mountain .	1,731	883	848	2,103	955	1,148	372	72	300
Far West* . . .	4,376	1,635	2,741	4,779	2,213	2,566	403	578	- 175
1958									
Total . . .	6,852	2,329	4,523	6,431	2,688	3,743	- 421	359	- 780
New England . .	372	13	359	99	61	38	- 273	48	- 321
Mideast	484	114	370	334	165	169	- 150	51	- 201
Great Lakes . .	678	156	522	383	214	169	- 295	58	- 353
Plains	468	137	331	442	200	242	- 26	63	- 89
Southeast	144	71	73	302	105	197	158	34	124
Southwest . . .	245	133	112	203	113	90	- 42	- 20	- 22
Rocky Mountain .	1,014	522	492	1,593	621	972	579	99	480
Far West	3,447	1,183	2,264	3,075	1,209	1,866	- 372	26	- 398
1949†									
Total . . .	5,830	1,943	3,887	6,094	3,239	2,855	264	1,296	-1,032
New England . .	393	5	388	133	108	25	- 260	103	- 363
Mideast	652	108	544	357	273	84	- 295	165	- 460
Great Lakes . .	662	163	499	447	357	90	- 215	194	- 409
Plains	499	169	330	507	354	153	8	185	- 177
Southeast	151	56	95	131	110	21	- 20	54	- 74
Southwest . . .	173	94	79	236	117	119	63	23	40
Rocky Mountain .	681	486	195	1,872	798	1,074	1,191	312	879
Far West . . .	2,619	862	1,757	2,411	1,122	1,289	- 208	260	- 468

* Alaska and Hawaii omitted in order to make 1963 data comparable with those of earlier years in this series.

† Data on first professional degree students in 1949 are not available.

Both the Great Lakes and Mideast regions have continued to attract Washington outmigrants. In both areas, however, it should be noted that the proportions have declined slightly since 1949. Most of the private institutions in this country are located in the Great Lakes, Southeast, Mideast, and New England regions. Considered as an aggregate, this area received a smaller proportion of Washington's outmigrants in 1963 (24.9 per cent) than in 1938 (33.3 per cent). Large expenditures of state and federal money since World War II for the development of public institutions of higher learning, coupled with increasing tuition and other costs, are among the factors involved in the shifting trend of college students toward public institutions located closer to their state of residence.

Immigration. The temporal pattern of college inmigrants to the state of Washington is very similar to the one discussed for outmigrants (Table 8:I and Figure 8:2). The volume of inmigrants has increased from 2,439 in 1938 to 9,397 in 1963. During the same period, total enrollment increased from 23,485 to 73,073. The ratio of the number of inmigrants to total enrollment indicates that there has been little change, from 10.4 to 12.9 per cent.

In 1963, the Far West region contributed 50.9 per cent of the total college inmigrants to this state, representing an increase over the corresponding figure of 42.7 per cent in 1938. In 1963, California contributed the largest proportion of students to the state of Washington. In previous years, the largest share of students from the Far West region came from Oregon. In 1963, the Rocky Mountain region sent 2,103 college students, or 22.4 per cent of the total inmigrants, to Washington. The proportion of students from this region has steadily diminished over the years. Nevertheless, in 1963, these two regions, combined, accounted for 73.3 per cent of all student migrants enrolled in colleges and universities in the state of Washington. Since 1949, the number of students from the Far West region has increased significantly. The number of college students who attended school in the state of Washington from the other six regions in 1963 was fairly widely distributed.

Net Migration. Data shown in Table 8:I indicate a general pattern of total net outmigration of Washington students to other states and regions in the United States. The one exception occurred in 1949. The total net gain for this date reflects the large number of nonresident World War II veterans enrolled at the University of Washington.

It is of further interest to note the remarkable balance since 1938 between the number of college student migrants who have entered or left this state. For example, in 1963, 9,586 Washington students attended school in some other state (excluding Alaska and Hawaii). This number was virtually offset by the 9,397 students from other states who attended colleges and universities in Washington. The net migration was -189.

Historically, several regional patterns of net migration of college students can be observed from an examination of the figures in Table 8:I. There has been a very definite shift in the pattern of net migration in the Far West region. In 1938, 1949, and 1958, there was a net outflow of college student migrants from Washington to other states in

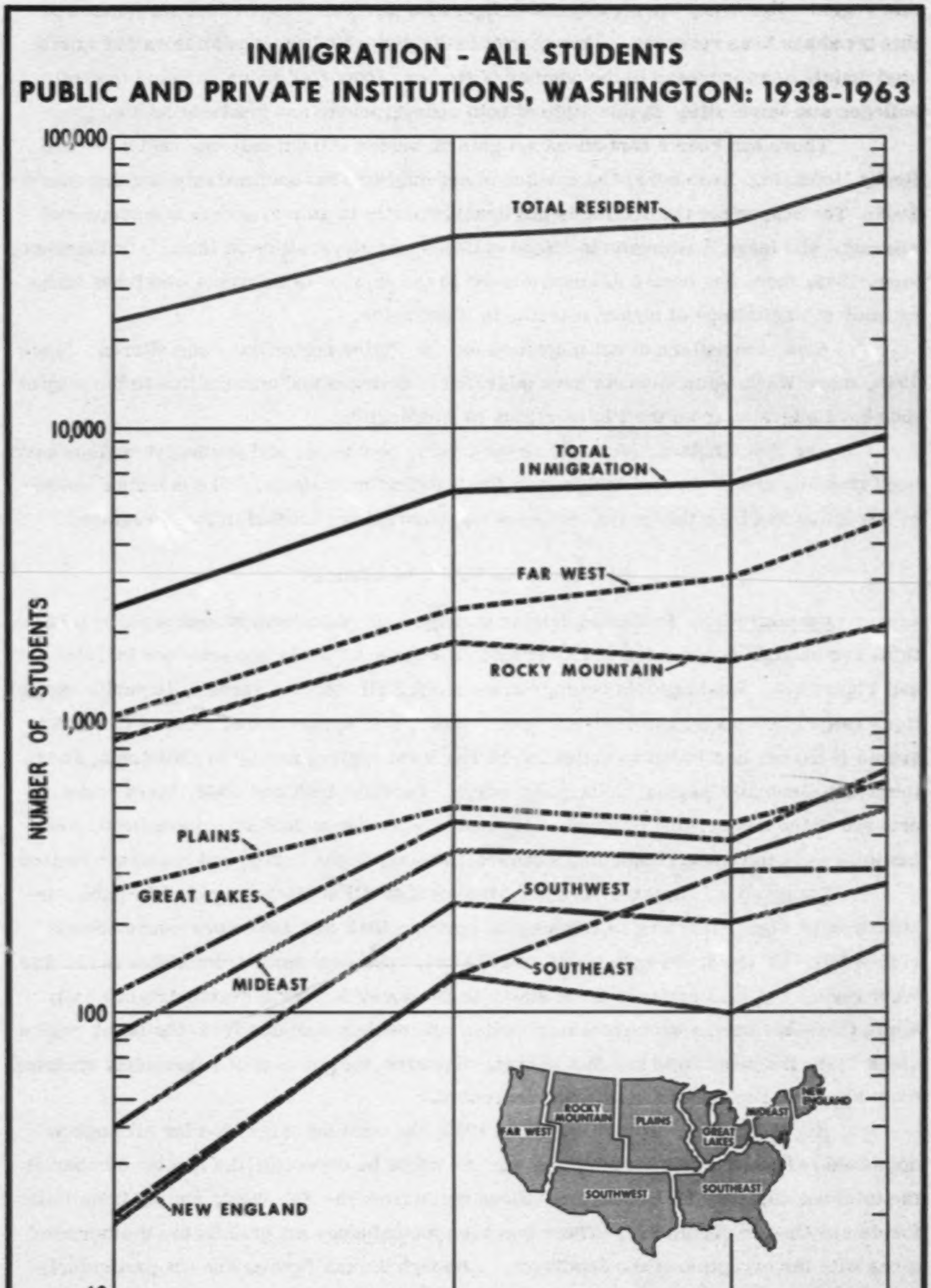
INMIGRATION - ALL STUDENTS
PUBLIC AND PRIVATE INSTITUTIONS, WASHINGTON: 1938-1963
NUMBER OF STUDENTS
100,000
10,000
1,000
100
10
1938
1949
1958
1963
TOTAL RESIDENT
TOTAL INMIGRATION
FAR WEST
ROCKY MOUNTAIN
PLAINS
GREAT LAKES
SOUTHWEST
MIDEAST
SOUTHEAST
NEW ENGLAND
FAR WEST
ROCKY MOUNTAIN
PLAINS
GREAT LAKES
MIDEAST
NEW ENGLAND
SOUTHWEST
SOUTHEAST

Figure 8:2

this region. However, the net migration figure for the Far West in 1963 indicates that this trend has been reversed. This change in the pattern of net migration can be attributed mainly to an increase in the number of students from California enrolled in public colleges and universities in this state at both undergraduate and graduate levels.

There has been a continuous net gain of students from only one region -- the Rocky Mountain. Even here, the number of net migrants has declined substantially since 1949. The reason for the decline is attributable partly to an increase in the number of migrants who leave Washington to attend colleges and universities in Utah. Furthermore, since 1949, there has been a downward trend in the number of migrants who leave Idaho to study at institutions of higher learning in Washington.

Also, the pattern of net migration for the Plains region has been altered. Since 1949, more Washington students have migrated to colleges and universities in this region than have migrated from the Plains region to Washington.

The New England, Mideast, Great Lakes, Southeast, and Southwest regions have been typically areas of net outmigration for Washington students. The principal source of attraction has been the private colleges and universities located in these regions.

All Students in Public Institutions

Outmigration. Published data on outmigration of students attending public institutions are available only since 1949. Trends by region and state are provided in Table 8:I and Figure 8:3. Washington's outmigration rate for all students enrolled in public institutions ranged between 6.1 in 1949 and 6.6 in 1963. It is apparent that most of the outmigrants (71.0 per cent) went to states in the Far West region, mainly to California, and to the Rocky Mountain region, principally Idaho. Between 1958 and 1963, there were increases in the number and proportion of Washington college students migrating to public institutions in the Rocky Mountain, Southwest, Plains, Great Lakes, and Southeast regions.

Inmigration. Approximately 9.0 per cent of all students enrolled in public institutions of higher learning in Washington between 1949 and 1963 were nonresidents (Table 8:I). Of the 4,994 inmigrants in 1963, 44.3 per cent came from states in the Far West region and 19.1 per cent from states in the Rocky Mountain region (Figure 8:3). While there has been a numerical increase in nonresident students from the latter region since 1958, the proportion has diminished. However, the per cent of nonresident students from all other regions since 1958 has increased.

Net Migration. For 1949, 1958, 1963, the total net migration for all regions combined indicated a gain for Washington. As might be expected, the largest number of the total net migrants for public institutions came from the Far West, mainly from California and Oregon (Table 8:I). There has been a continuous net gain from all other regions with the exception of the Southwest. Although the net figures are not particularly large, they do indicate that Washington's public institutions have continued to attract out-of-state students.

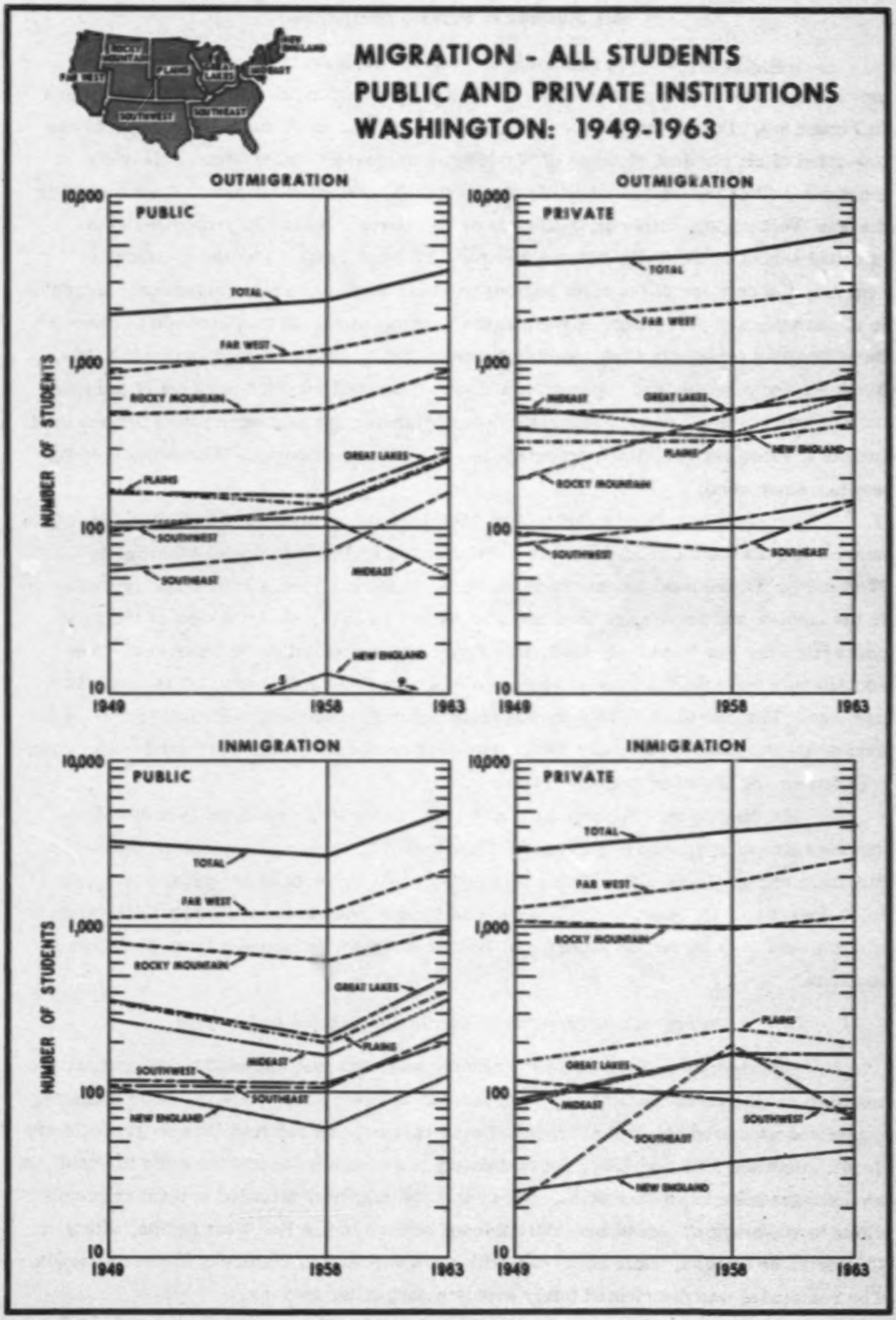
MIGRATION - ALL STUDENTS
PUBLIC AND PRIVATE INSTITUTIONS
WASHINGTON: 1949-1963
FAR WEST
ROCKY MOUNTAIN
PLAINS
GREAT LAKES
MIDEAST
NEW ENGLAND
SOUTHWEST
SOUTHEAST
OUTMIGRATION
PUBLIC
PRIVATE
INMIGRATION
NUMBER OF STUDENTS
10,000
1,000
100
10
1949
1958
1963
TOTAL
FAR WEST
ROCKY MOUNTAIN
GREAT LAKES
PLAINS
SOUTHWEST
SOUTHEAST
MIDEAST
NEW ENGLAND
5
9

Figure 8:3

All Students in Private Institutions

Outmigration. Data pertaining to state of Washington students enrolled in private institutions of higher learning outside of Washington are shown in Table 8:I and in Figure 8:3. During the fourteen-year period, 1949 to 1963, between one-fourth and one-third of all resident students of Washington migrated to other states. In 1963, almost one-half of the total number of outmigrants (6,043) attended private institutions in the Far West region, either in California or in Oregon. A sizable proportion also attended school in the Rocky Mountain region (14.0 per cent). The Rocky Mountain region is the only one of the eight regions in which there has been a substantial increase in the number and percentage of Washington's outmigrants. A considerable number of them attended schools in Utah, notably Brigham Young University. The Great Lakes, Mideast, and New England regions, combined, accounted for 28.8 per cent of the total outmigration in this category in 1963. Notwithstanding the concentration of private institutions in these regions, this percentage has declined when compared with the 1949 figure (36.8 per cent).

Inmigration. During the 1949 to 1963 period, between 22.2 and 25.1 per cent of nonresident students attended private institutions of higher learning in Washington (Table 8:I). Of the total number of inmigrants, there has been a substantial increase in the number and percentage from the Far West. In 1949, 45.1 per cent of the total came from the Far West. By 1963, this figure had increased to 58.3 per cent. The contribution from the Rocky Mountain region has declined and leveled off at about 26.0 per cent. The Far West and Rocky Mountain regions, combined, accounted for 84.4 per cent of all student inmigrants in 1963. The remaining inmigrants were fairly evenly distributed among the other regions (Figure 8:3).

Net Migration. Between 1949 and 1963, there was a total net loss of college students attending private institutions. This holds for every region, except the Rocky Mountain region (Table 8:I). Within this region, two currents of net migration appear to be operative: (1) a net centrifugal flow of Washington students, mainly to the state of Utah, and (2) a larger net centripetal flow of students, principally from Idaho and Montana.

Undergraduate Students in Public and Private Institutions

Outmigration. Data on undergraduate migrants who attended public and private institutions outside of Washington are presented in Table 8:II. Undergraduate students, expressed as a proportion of all resident students, migrate far less than do graduate students. Between 1949 and 1963, approximately one of every ten left the state to enroll as an undergraduate in another state. Those that did migrate, attended college relatively close to Washington. About one-half attended college in the Far West region, either in California or Oregon, while about one-fifth were enrolled in the Rocky Mountain region. The remainder was distributed fairly evenly among other regions.

In summary, over-all trends reveal that not only is the rate of undergraduates who migrate typically low, but also, that these migrants appear to be traveling shorter distances from their home state.

Inmigration. Between 1949 and 1963, the proportion that inmigrants constituted of the total enrollment varied between 11.2 and 12.6 per cent (Table 8:II). Of the total number of inmigrants, about 75.0 per cent came from the Far West and Rocky Mountain regions. Since 1949, an increasing proportion of undergraduates came from the Far West region. Between 1949 and 1963, there was an increase from 41.6 to 56.1 per cent. The pattern of inmigrants to Washington from the remaining regions indicate a decline since 1949. This is also true of the Rocky Mountain region.

Net Migration. Analysis of net migration flows by region reveal several interesting points about undergraduate students. Washington, which had a net loss of students to the Far West region in 1949 and in 1958, experienced a substantial net migration gain from this region in 1963. There continues to be a net gain from the Rocky Mountain region although the net number of undergraduates has declined substantially since 1949. Within the Rocky Mountain region, there appears to be some variation in the pattern of net migration. A large net number of undergraduates from Montana continues to attend schools in this state. This is counteracted by an increasing volume of net outmigrants from Washington to Utah. Idaho, once a state of large net migration to Washington, now receives as many undergraduates from Washington as it sends. For the six other regions, the pattern of net migration from 1949 to 1963 generally indicates a stable net migration loss.

Graduate Students in Public and Private Institutions

Outmigration. Data on Washington graduate student migrants to institutions in other states are presented in Table 8:II. The mean outmigration rate of graduate students (26.1) between 1949 and 1963 is substantially larger than that for undergraduates (11.5). In 1963, slightly more than one-third of the total number of graduate outmigrants enrolled in states in the Far West region. This indicates a decline from the percentage of outmigrants in 1958 (41.4 per cent). Another ten per cent studied at graduate schools in the Rocky Mountain region. This proportion has been increasing steadily since 1949. There also has been a slight relative increase in graduate students enrolled in schools in the Great Lakes and Mideast regions between 1958 and 1963. However, this proportion is substantially less than what it was in 1949 (41.4 per cent). The percentage of graduate student migrants to the New England region has declined steadily since 1949.

Inmigration. Between 1949 and 1963, the proportion of inmigrants to Washington ranged from 20.7 to 29.9 per cent (Table 8:II). In 1963, 32.4 per cent of these inmigrants came from states in the Far West region, 15.2 per cent from the Rocky Mountain region, and 30.5 per cent from the Great Lakes, Mideast, and New England regions, combined. Inspection of the figures in Table 8:II reveals a remarkably stable pattern in the regional distribution of graduate inmigrants between 1949 and 1963.

TABLE 8:II

Migration of Undergraduate and Graduate Students
Public and Private Institutions by Region
Washington: 1949, 1958, and 1963

Region and Year	Outmigration		Inmigration		Net Migration	
	Undergraduate	Graduate	Undergraduate	Graduate	Undergraduate	Graduate
1963						
Total . . .	7,365	1,432	7,402	1,681	37	249
New England . .	343	81	99	68	- 244	- 13
Mideast	339	242	307	179	- 32	- 63
Great Lakes . .	559	235	391	267	- 168	32
Plains	457	126	400	201	- 57	75
Southeast	214	53	206	86	- 8	33
Southwest . . .	302	60	181	80	- 121	20
Rocky Mountain .	1,571	120	1,669	256	98	136
Far West* . . .	3,580	515	4,149	544	569	29
1958						
Total . . .	5,153	1,069	5,274	881	121	-178
New England . .	237	61	60	37	- 177	- 24
Mideast	290	148	221	112	- 69	- 36
Great Lakes . .	401	172	249	120	- 152	- 52
Plains	266	80	341	87	75	7
Southeast	97	35	250	50	153	15
Southwest . . .	190	46	154	42	- 36	- 4
Rocky Mountain .	924	79	1,315	134	391	55
Far West	2,748	438	2,684	299	- 64	-139
1949						
Total . . .	4,957	873	5,344	750	387	-123
New England . .	308	85	104	29	- 204	- 56
Mideast	449	203	271	86	- 178	-117
Great Lakes . .	504	158	337	110	- 167	- 48
Plains	416	83	390	117	- 26	34
Southeast	138	13	101	30	- 37	17
Southwest . . .	147	26	203	33	56	7
Rocky Mountain .	653	28	1,715	157	1,062	129
Far West	2,342	277	2,223	188	- 119	- 89

* Alaska and Hawaii omitted in order to make 1963 data comparable with those of earlier years in this series.

Net Migration. In 1949 and 1958, Washington experienced a net loss of graduate students. However, by 1963, this trend had been reversed (Table 8:II). The Far West and Great Lakes regions now contribute a net inflow of graduate students to this state. A net gain of graduate students continues to come from the Rocky Mountain region. On the other hand, the New England and Mideast regions continue to be areas of net outmigration.

CHAPTER 9

DETERMINANTS OF MIGRATION DIFFERENTIALS

Introduction

This chapter is devoted to a regression analysis of college student migration from Washington. Washington residents attending school in a particular state may be interpreted as a migration stream originating in Washington and terminating in the particular state in question. Thus, the analysis may be conceived of as a study of 50 migration streams, all originating in Washington State. Destinations of these streams lie in the remaining 49 states and the District of Columbia.

The treatment of subject matter in this chapter may be contrasted with the approach of preceding chapters, in which a description of student migration patterns was emphasized. In the present chapter, focus is on factors which account for student migration patterns. More specifically, the goal is to isolate factors at destinations of migration streams which correlate with the size of migration streams to these destinations.

In the terminology employed in this study, destination factors which correlate with migration volume have been designated "attractiveness" factors, or, when referring to their combined effect, simply, "attractiveness." Other terms might be as satisfactory. For instance, one could call these factors "opportunities," a label used in previous studies. The important consideration is the need for a term to characterize the features of a destination which favor it as a goal for student migrants, and attractiveness seems to fulfill this requirement. As indicated below, the idea of attractiveness or "force of attraction" is not unique to this study, but has had a place in the vocabulary of migration analysis since its earliest beginnings.

The methodology employs the gravity concept as the basis of a migration model. This model includes known parameters specifying interstate distance and population at the source of a migration stream. An unspecified parameter is included as a measure of attractiveness. When applying the model, values for this parameter have to be estimated from data, and a unique feature of the methodology is the use of maximum likelihood to determine the best estimator.

The analysis proceeds by stages. First, the unknown parameter (attractiveness) is estimated, and the estimated values are substituted in the gravity model. Second, regression analysis is performed to assess the degree of conformity between model and data. Third, the estimates of attractiveness are utilized as values of a dependent variable, and regression is again performed. At this stage of the analysis, the independent variables in the regression are educational and demographic variables measured at the destination of migration streams. Each stage of the analysis has a specific purpose. At the first stage, the estimation procedure provides a measure of attractiveness in terms of migration data. The second stage provides a test, both of the model and of the effectiveness of the measure of attractiveness. The test lies in the degree to which the model fits the data. The third stage involves the determination of correlates of attractiveness. This final analytical stage is central to the problem. It attempts to answer the question: what are the factors at destinations which influence student migration to these destinations?

Model and Plan of Analysis. A basic premise of this approach conceives of differential migration from Washington as resulting from differential attractiveness of destinations. This concept of differential attractiveness when applied to migration has an ancient and venerable history. Ravenstein, one of the earliest investigators to study migration systematically, referred to an attractive force exerted by growing cities of England on migrants from remote parts of the British Isles.[1] The idea of attractiveness was also utilized by E. C. Young in 1924 when formulating a theory of the movements of migratory farm workers. The factors drawing migratory workers to a destination were labeled "forces of attraction" by Young.[2]

As postulated in the present study, attractiveness may be interpreted as the sum total of characteristics of a destination favoring it as a target of migration. One may justifiably question the utility of a concept so general in nature. However, as noted above, the notion of attractiveness provides the researcher with a very flexible tool. Further, it will be demonstrated how one may provide a referent for this concept using migration-stream data. This may be accomplished independently of knowledge of specific elements of attractiveness such as economic factors, climate, population, employment opportunities, etc. Although migration data are utilized in the estimation procedure, it should be noted that attractiveness is not synonymous with the number of inmigrants to an area. Areas may be equally attractive to migrants, yet vary in amounts of inmigration. This may be true especially when areas differ in geographical proximity to sources of outmigration.

Distance is a deterrent to migratory movements. Migration streams of different lengths will (other things being equal) exhibit different volumes of migration. This was recognized by Ravenstein when formulating his "Laws of Migration," and his findings have been supported by numerous other investigations. Ravenstein did not specify the exact form of the relation between distance and volume of migration. He did, however, note that most moves are short moves, and that long-distance moves generally terminated in "great centers of commerce and industry," that is, in centers where the force of attraction was large.[3]

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[1] E. G. Ravenstein, "The Laws of Migration," Journal of the Royal Statistical Society, Vol. XLII, Part II (June, 1885), pp. 167-235.

[2] E. C. Young, The Movement of Farm Population, Cornell Agricultural Station, Bulletin 426, Ithaca, New York, 1924.

Other writers have attempted to translate into mathematical terms the findings of Ravenstein, as well as their own findings concerning the effects of distance. Prominent among these mathematical interpretations are gravity models, so named because of their resemblance to Newton's law of physical gravitation.[4] A well-known example of a gravity model is the P_1P_2/D hypothesis promulgated by George Zipf in the 1940's.[5] According to Zipf's hypothesis, the volume of migration between two cities is directly proportional to the product of the populations of the two cities, and inversely proportional to the distance between them. Most gravity models are variants of this theme. The most important modifications which have been introduced consist of raising the distance variable to a power other than one (e.g., using D^2 in the denominator), and weighting the populations both at the source and at the destination by factors purporting to measure the propensity to send and to receive migrants.[6]

As hypotheses seeking to explain differential migration, many gravity models of the P_1P_2/D type are limited in scope in that they presuppose that population and distance are the sole determinants of migration. A more general conception of a gravity model has been introduced by Isard.[7] Isard presented his model as a mathematical interpretation of Ravenstein's laws of migration. In Zipf's form of the gravity model, the migration from i to j is proportional to P_iP_j/D_{ij}, but Isard substituted for P_j the function $f(Z_j)$. In this formulation, the value of Z_j does not have a specific referent; Isard merely calls it a "force of attraction." Thus, the migration from i to j is dependent upon P_i, the population at the source; D_{ij}, the intervening distance, and $f(Z_j)$, a function of the "force of attraction at j."

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[3] Ravenstein, loc. cit., p. 199.

[4] The literature on gravity models and their application to migration studies is fairly extensive. A summary of findings prior to 1956 may be found in Gerald A. P. Carrothers, "An Historical Review of the Gravity and Potential Concepts of Human Interaction," Journal of the American Institute of Planners, Vol. 22, No. 2 (Spring, 1956), pp. 94-102.

[5] George Zipf, "The P_1P_2/D Hypothesis on the Intercity Movement of Persons," American Sociological Review, Vol. 11 (December, 1946), pp. 677-686.

[6] Stuart C. Dodd, "The Interactance Hypothesis: A Gravity Model Fitting Physical Masses and Human Groups," American Sociological Review, Vol. 15 (April, 1950), pp. 245-256.

[7] Walter Isard, Methods of Regional Analysis: An Introduction to Regional Science, Technology Press of the Massachusetts Institute of Technology and John Wiley and Sons, New York, 1960, p. 68.

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The migration model adopted for the present study is in all essential characteristics identical to the one proposed by Isard. It assumes that migration of college students is a function of (1) the student-age population at the origin, (2) the distance intervening between origin and destination, and (3) a force of attraction at the destination. In mathematical notation, the conception has the form

$$M_{ij} = k \frac{P_i A_j}{D_{ij}} \tag{1}$$

where i is not equal to j and where

M_{ij} is the volume of the migration stream from i to j ,
P_i is the student-age population at the source i of the migration stream,
A_j is a parameter measuring the attractiveness at the destination j ,
D_{ij} is the distance from i to j , and
k is a constant of proportionality.

In the analysis of college student migration from Washington, the above model was employed in conjunction with regression analysis. The procedure involves a series of stages. These stages are as follows:

1. The A_j values are estimated, one value determined for each state of destination. The A_j values are estimated from data showing the total inmigration to a state, from all other states, for the category of students under consideration.[8] The method of maximum likelihood is used for the estimation procedure. The estimated values of A_j are interpreted as measures of attractiveness; that is, A_j is assumed to measure state j's ability to attract student migrants.
2. The estimated A_j values are substituted in the above model, and regression analysis is performed, using student migration from Washington to each of the other states as the dependent variable. The value of r^2 obtained in the process is considered to be a measure of the proportion of variance in the dependent variable accounted for by the model. In this second stage, the regression formula is

$$M_{wj} = b_o + b_1 \frac{A'_j}{D_{wj}} + e \tag{2}$$

where

M_{wj} is the volume of the migration stream from Washington to state j ,

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[8] For definitions of student categories, see preceding chapters. Total inmigration includes student inmigration from all states, not only from Washington.

A'_j is the estimate of A_j, the attractiveness of state j,
D_{wj} is the distance from Washington to state j,
b_o and b_1 are regression coefficients, $b_o = 0$, and
e is the error term.

As P_w, Washington's college-age population, is constant throughout, it was not necessary to include this parameter at this stage.

3. In the third stage of analysis, estimates of A_j become values of a dependent variable, and regression analysis is performed using demographic and educational measures for each state of the United States and the District of Columbia as independent variables. This stage provides information on correlates of attractiveness. That is, the purpose of this third stage is to determine variables which correlate with attractiveness. The regression formula at this stage is

$$A'_j = b_o + b_1 z_{1j} + \ . \ . \ . \ + b_n z_{nj} + e \tag{3}$$

where

A'_j is the estimate of attractiveness of state j obtained at stage 1,
z_{1j} through z_{nj} are demographic and educational measures characterizing state j,
b_o through b_n are regression coefficients, and
e is the error term.

Stages of Analysis

Stage 1: Estimating Attractiveness (A_j). Before estimates can be obtained for the attractiveness parameter, it is necessary to select values to represent the population and distance parameters.

The notion of distance between areas as large as states is a fairly ambiguous concept. States may have considerable areal extent, and distance between areas cannot be defined as precisely as the distance between points. One may partially overcome this difficulty by the expedient of assuming that all outmigration from a state issues from a single point within that state and that all inmigration to a state has this same point as destination. Thus, under these assumptions states are reduced to points, and interstate distances may be defined as distances between these points. For this study, the points selected were the 1960 state centers of population supplied by the U. S. Bureau of the Census.[9] These data provide coordinates of latitude and longitude of centers of population of each state and the District of Columbia. A computer program was used to translate these data into interstate distances. Distances in miles from the population center of Washington to the population center of each of the remaining states and the District of Columbia may be observed in Table 9:III.

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[9] United States Department of Commerce, Bureau of the Census, "1960 State Centers of Population," dittoed transcript (August 2, 1961), 5 pp.

In order for migration to occur, there must be a source of migrants; that is, there must be a population subject to the risk of migrating. This population is represented by the parameter P_i in the gravity model selected for the study (Formula 1). It would be possible to use as values for the P_i the total population of each state, under the assumption that populous states would send forth large numbers of student migrants, and less populous states, small numbers of student migrants. However, it was felt that a more logical selection for a student migration study would be the college-age population. Data from the 1960 census indicate that 75.4 per cent of college students are in the 18-24 year age group. Extending the age range to include the 25-29 year age group accounts for another 15.2 per cent, so that the 18-29 year age group contains slightly over 90.0 per cent of those classified as college students at the time of the 1960 census. These findings led to the adoption of the population 18-29 years of age for the various states as values for the parameter P_i.

When estimating values of the parameter A_j, data on college student inmigration to each state from every other state were utilized. These data may be represented as a matrix in which the entry in cell ij is the number M_{ij} of residents of state i who attend institutions of higher learning in state j. Thus, the matrix summarizes the pattern of interstate migration of college students.

Formula 1 is the gravity model which was selected as a summary description of the student-migration process. Under the assumptions of the model, the expected numbers in each cell of the migration matrix are given by Formula 1. However, due to probability considerations, the observed cell entries will deviate from values provided by the formula. The actual entries may be considered to be observations obtained in sampling from a multinomial probability distribution having parameters p_{ij}. The parameters p_{ij} are assumed to be functions of further parameters: P_i, D_{ij}, and A_j. Values for P_i and D_{ij} are given, but values for A_j are unknown and must be estimated from the observations. Utilizing the method of maximum likelihood, the estimates of the A_j are found to be:

$$A'_j = \frac{M_{.j}}{V_j} \tag{4}$$

where

A'_j is the maximum likelihood estimator of A_j,

$M_{.j}$ is the total inmigration to state j (total for the category of students under consideration), and

$V_j \quad = \sum_i P_{ij}/D_{ij}$, i not equal to j , is the student-age population potential of state j .[10]

The population potential expresses, in terms of persons-per-mile, the distance of a state from sources of student migrants.[11] The value of V_j thus depends on the geographical remoteness of state j from student-age population.[12] The values computed for the study showed the District of Columbia to have the highest potential and Hawaii, the lowest.

In addition to the merit of being derived in a logical manner, the estimates have a certain intuitive appeal. If a state is geographically remote from population, it may rate high in attractiveness factors, yet experience only moderate inmigration because of the resistive effects of distance. Migrants may not wish to travel long distances to take advantage of the benefits offered by a remote state. Likewise, a state may possess only a moderate degree of attractiveness and still experience large inmigration because of its proximity to sources of migrants. Thus, if one utilizes an inverse-distance form of gravity model, the use of inmigration as a measure of attractiveness may tend to under- or overstate actual attractiveness.[13]

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[10] The likelihood function is

$$\frac{M_{..}\,!}{M_{12}!\ \ldots\ M_{ij}!\ \ldots\ M_{n(n-1)}!}\,(p_{12})^{M_{12}}\ldots(p_{ij})^{M_{ij}}\ldots(p_{n(n-1)})^{M_{n(n-1)}}$$

where $i \neq j$, and where

M_{ij} is the observed migration from state i to state j ,
$M_{..} \ = \sum_i\sum_j M_{ij}$ is the total number of interstate migrants, and
p_{ij} is the probability of migrating from state i to state j .

The estimation procedure involves estimating values of A_j which maximize the likelihood function under the conditions that p_{ij} is proportional to P_iA_j/D_{ij} and that $\sum_i\sum_j p_{ij} = 1$.

[11] The concept, "population potential" was first used by John Q. Stewart. For a discussion of the concept of population potential, see John Q. Stewart and William Warntz, "Macrogeography and Social Science," The Geographical Review, Vol. XLVIII, No. 2, 1958, pp. 167-184.

[12] When estimating values of A_j , the diagonal cells of the migration matrix are considered to be empty. The diagonal cells represent a state's migration from itself to itself. The gravity model is not easily applied to this case as the concept distance is difficulty to apply. When the diagonal cells are empty, the population potential of a state does not include its own population, but only populations of all other states.

[13] A problem similar in nature was faced by Stouffer when deciding to use inmigration as a measure of "opportunities." This measure tended to overstate opportunities in regions located in populous areas and to understate opportunities in regions remote from population centers. Stouffer attempted to correct for this deficiency with his notion of "competing migrants." See Samuel A. Stouffer, "Intervening Opportunities and Competing Migrants," Journal of Regional Science, Vol. 2 (Spring, 1960), pp. 1-26.

However, the estimate of attractiveness provided by Formula 4 overcomes this difficulty. The volume of inmigration is weighted by $1/V_j$, that is, by the inverse of the population potential. For states remote from sources of migrants, the population potential V_j will be small and $1/V_j$ will, therefore, be large. According to Formula 4, then, the measurement of attractiveness will be inmigration weighted by a relatively large number, and the weighting procedure will correct for the understatement of attractiveness obtained when using inmigration alone. Similarly, for states close to population centers, the tendency for inmigration to overstate attractiveness will be compensated by weighting inmigration volume with $1/V_j$ where, in this case, $1/V_j$ is a relatively small number.

Values of relative attractiveness for each state and the District of Columbia are shown in Table 9:I for both public and private institutions. These values were derived from Formula 4 which provides the maximum likelihood estimators of A_j. The entries in Table 9:I have been scaled so as to equal 1,000 when a state possesses average attractiveness.

Preliminary experiments indicate that attractiveness measures differ by category of student. The major differences are between students attending public institutions and students attending private institutions, so two estimates of A_j were determined for this public-private dichotomy. The division into public and private students includes both undergraduates and graduates, but excludes the category of first professional degree students. This grouping is retained throughout this chapter.

Stage 2: Measuring the Fit of the Gravity Model. In order to measure the degree to which the gravity model shown in Formula 1 accounts for student outmigration from Washington to other states, a regression analysis was performed. Separate regressions were run for students attending public institutions, and for students attending private institutions. Also, it was decided to include separate analyses for the estimate of attractiveness given by the maximum likelihood technique (Formula 4) and an estimate of attractiveness, using simply inmigration. Thus, in the first instance, the independent variable is $M_{.j}/D_{wj}V_j$ (inmigration divided by distance from Washington times population potential) and in the second instance, the independent variable is $M_{.j}/D_{wj}$ (inmigration divided by distance from Washington). The clear superiority of the estimate involving the student-age population potential is shown in Table 9:II.

The results shown in the table indicate that inmigration divided by student-age population potential is a superior estimator of attractiveness than inmigration alone. This is true for both categories of students. For students attending public institutions, the correlation coefficient between migration from Washington and values obtained through a gravity model in which the attractiveness estimate incorporates the population potential is .92 (85 per cent of the variance explained). When the attractiveness measure is simply inmigration, the correlation drops to .84 (71 per cent of the variance explained). This finding also applies to the case of students attending private institutions, although the

TABLE 9:I

States Ranked by Index of Attractiveness*

Public and Private Institutions: 1963

Public Institutions			Private Institutions		
Rank	State	Index	Rank	State	Index
1	California	8,695	1	California	4,784
2	Colorado	2,451	2	Massachusetts	4,258
3	Texas	2,383	3	New York	3,738
4	Arizona	2,376	4	Pennsylvania	3,208
5	Washington	2,043	5	Utah	1,982
6	Hawaii	2,006	6	Missouri	1,849
7	Oregon	1,753	7	Indiana	1,847
8	Michigan	1,613	8	Texas	1,730
9	Indiana	1,432	9	Ohio	1,684
10	Wisconsin	1,428	10	Iowa	1,681
11	Kansas	1,286	11	District of Columbia	1,583
12	Missouri	1,266	12	Illinois	1,451
13	Ohio	1,206	13	Washington	1,410
14	Oklahoma	1,175	14	North Carolina	1,380
15	New Mexico	1,170	15	Tennessee	1,333
16	Utah	1,142	16	Florida	1,262
17	Iowa	1,133	17	Oregon	1,242
18	Florida	1,130	18	Minnesota	1,189
19	North Carolina	1,017	19	Colorado	1,052
20	Minnesota	987	20	Wisconsin	1,022
21	Tennessee	957	21	Connecticut	760
22	Georgia	873	22	Virginia	699
23	Nebraska	863	23	Nebraska	678
24	Kentucky	811	24	Kansas	662
25	Virginia	724	25	Georgia	655
26	Mississippi	698	26	Louisiana	655
27	Alabama	658	27	New Jersey	654
28	Illinois	560	28	Michigan	629
29	South Carolina	559	29	South Carolina	576
30	Montana	535	30	Vermont	505
31	Louisiana	517	31	Kentucky	478
32	North Dakota	507	32	Maine	465
33	Idaho	468	33	New Hampshire	463
34	South Dakota	451	34	Rhode Island	458
35	West Virginia	449	35	Maryland	438
36	Pennsylvania	446	36	Oklahoma	438
37	Wyoming	443	37	Alabama	431
38	Arkansas	405	38	South Dakota	274
39	Maryland	374	39	West Virginia	262
40	Vermont	262	40	Idaho	260
41	New Hampshire	230	41	Mississippi	236
42	Maine	219	42	Arkansas	216
43	New Jersey	186	43	Hawaii	116
44	New York	183	44	New Mexico	116
45	Delaware	162	45	Montana	89
46	Nevada	154	46	Delaware	48
47	District of Columbia	147	47	Arizona	26
48	Alaska	136	48	North Dakota	24
49	Connecticut	122	49	Alaska	4
50	Massachusetts	118	50	Nevada	†
51	Rhode Island	94	51	Wyoming	†

* Attractiveness index = $\frac{A'_j}{(\text{mean } A'_j)}$ (1,000) where A'_j is the maximum likelihood estimator of the attractiveness factor at state j.

† No private institutions.

TABLE 9:II

Comparisons between Estimates of Attractiveness
Results of Regression Analyses*

Measure	Students	
	Public Institutions	Private Institutions
Independent Variable = $\frac{M_{.j}}{D_{wj}V_j}$ †		
Correlation Coefficient	.92	.98
Coefficient of Determination	.85	.95
Standard Error of Estimate	65.96	56.85
Independent Variable = $\frac{M_{.j}}{D_{wj}}$ †		
Correlation Coefficient	.84	.70
Coefficient of Determination	.71	.49
Standard Error of Estimate	91.19	184.81

* Dependent variable is student migration from Washington to state j .

† $M_{.j}$ is number of student inmigrants to state j from all states.

D_{wj} is distance from Washington to state j .

V_j is population of state j (population 18-29 years of age).

differences resulting from using alternate estimates of attractiveness are more marked. When the estimate of attractiveness is inmigration divided by potential, the correlation between model and observations is .98 (95 per cent of the variance explained). When the estimate is based on inmigration alone, the coefficient of correlation is .70 (49 per cent of the variance explained).

Some idea of the goodness of fit between migration data and the gravity model utilizing the estimate of attractiveness derived from Formula 4 may be obtained from an examination of Table 9:III. It may be noted that in some cases the estimates provided by the model depart by considerable amounts from observed values of the sizes of migration streams from Washington. This may be due in part to the method used to define distance. For instance, the number of migrants to Idaho is seriously understated by the model. With distances measured between population centers, the distance from Washington to Idaho is defined to be 385 miles, in spite of the fact that Spokane, Washington's second largest city, lies practically on the Washington-Idaho border. Thus, distance

TABLE 9:III

Comparison between Observed and Estimated Outmigration Derived from Regression Analysis by Region and State Washington: 1963

Region and State	Distance from Washington (in miles)	Number of Outmigrants			
		Public Institutions		Private Institutions	
		Observed	Estimated	Observed	Estimated
New England	...	8	11*	416	314*
Connecticut	2,389	2	...	95	21
Maine	2,455	2	3	3	- 4
Massachusetts	2,433	...	...	270	305
New Hampshire	2,403	3	4	34	- 4
Rhode Island	2,449	...	- 1	3	- 5
Vermont	2,322	1	5	11	1
Mideast	...	45	28*	536	589*
Delaware	2,322	...	2	...	-38
District of Columbia	2,282	...	1	147	95
Maryland	2,284	28	9	18	- 4
New Jersey	2,352	4	2	54	13
New York	2,305	6	2	239	279
Pennsylvania	2,219	7	12	78	244
Great Lakes	...	274	257*	520	509*
Illinois	1,910	52	19	209	108
Indiana	1,803	70	59	94	161
Michigan	1,833	73	66	87	26
Ohio	1,964	34	45	64	128
Wisconsin	1,582	45	68	66	86
Plains	...	250	356*	333	602*
Iowa	1,430	39	59	79	191
Kansas	1,389	35	69	34	52
Minnesota	1,323	89	55	71	136
Missouri	1,596	28	59	107	187
Nebraska	1,239	36	51	35	66
North Dakota	1,018	12	35	...	-37
South Dakota	1,101	11	28	7	7
Southeast	...	154	283*	113	250*
Alabama	2,059	11	21	3	...
Arkansas	1,735	7	15	8	-17
Florida	2,510	19	32	7	58
Georgia	2,192	7	28	6	17
Kentucky	1,937	14	29	1	7
Louisiana	1,952	14	17	11	24
Mississippi	1,942	10	25	1	-18
North Carolina	2,282	17	31	8	78

TABLE 9:III

Comparison between Observed and Estimated Outmigration Derived from Regression Analysis by Region and State Washington: 1963 (Continued)

Region and State	Distance from Washington (in miles)	Number of Outmigrants			
		Public Institutions		Private Institutions	
		Observed	Estimated	Observed	Estimated
Southeast (Continued)					
South Carolina	2,276	5	16	29	8
Tennessee	1,957	6	35	24	93
Virginia	2,279	35	21	13	19
West Virginia	2,102	9	13	2	-17
Southwest	...	254	407*	108	117*
Arizona	1,103	105	167	3	-37
New Mexico	1,192	41	74	1	-23
Oklahoma	1,499	31	58	20	16
Texas	1,684	77	108	84	161
Rocky Mountain	...	848	536*	843	758*
Colorado	983	107	193	109	170
Idaho	385	496	92	216	92
Montana	508	145	79	21	- 7
Utah	669	70	131	497	545
Wyoming	784	30	41	...	-42
Far West	...	1,682	1,637*	2,526	2,254*
Alaska	1,439	17	4	...	-42
California	825	909	830	1,183	1,106
Hawaii	2,706	92	55	4	-34
Nevada	681	9	14	...	-42
Oregon	188	655	734	1,339	1,266

* Regional estimates are sums of individual state estimates.

between population centers is probably an unreal estimate of the distances actually traveled by the majority of Washington residents attending college in Idaho.

Stage 3: Determining Correlates of Attractiveness. In Stage 1 of this study, a method was developed for estimating the attractiveness of a state as a target for student migrants. In Stage 2, this estimate of general attractiveness was related to the volume of a state's college student inmigration from Washington. The third stage of the study is devoted to supplying a referent to the general notion of attractiveness in terms of demographic and educational variables characterizing the various states. The question is: what variables correlate with attractiveness?

The variables selected for consideration as independent variables were chosen on the basis of an examination of the literature on general migration and student migration. A total of 28 variables was selected to be used in the preliminary analysis. As is typical in the application of multiple regression, there was much redundancy and overlap in ability to account for variance in the dependent variable. At the final stage of the analysis, seven variables were selected as independent variables to be related to the dependent variable, attractiveness. These were divided on the basis of the analysis into two categories of four variables each (one variable was common to both categories). One category contained variables which correlated with the attractiveness factor for students attending public institutions of higher learning; a second category correlated with the attractiveness factor for students attending private institutions of higher learning.[14]

One variable, population 18-29 years of age, was included in both of the above categories. This variable was introduced to permit analysis of the effects of other independent variables when the population factor was held constant.

The two categories of variables were analyzed separately. Thus, there were two regression analyses. For the analysis of variables related to the attractiveness factor for students attending public institutions, the regression model is

$$A'_j = b_o + b_1 z_{1j} + b_2 z_{2j} + b_3 z_{3j} + b_4 z_{4j} + e$$

where

A'_j is the maximum likelihood estimator of the attractiveness factor for students attending public institutions in state j (Table 9:I),

z_{1j} is income from private gifts to public institutions in 1959 (in 1,000's of dollars) in state j,

z_{2j} is the number of faculty in public institutions of higher learning in 1962 in state j,

z_{3j} is median number of school-years completed by persons 25 years or older in 1960 in state j,

z_{4j} is the population aged 18-29 years in 1960 (in 1,000's) at state j,

b_o through b_4 are regression coefficients, and

e is the error term.

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[14] Sources of data for these variables are as follows: 1960 population 18-29 years of age, and median school-year completed by persons 25 and older were obtained from 1960 census reports. Variables relating to income, faculty, and library volumes were obtained from Felix H. I. Lindsay, Financial Statistics of Institutions of Higher Education, U. S. Department of Health, Education, and Welfare, OE-50023-60, Circular No. 744; Theodore Samore and Doris C. Holladay, Library Statistics of Colleges and Universities, 1963-64, Institutional Data, U.S. Department of Health, Education, and Welfare, OE-15023-64, Circular No. 769; Ralph E. Dunham and Patricia S. Wright, Faculty and other Professional Staff in Institutions of Higher Education, U. S. Department of Health, Education, and Welfare, OE-5300-62, Circular No. 747.

In the analysis of variables related to the attractiveness factor for students attending private institutions, the regression model is

$$A''_j = b'_o + b_5 z_{5j} + b_6 z_{6j} + b_7 z_{7j} + b_4 z_{4j} + e$$

where

A''_j	is the maximum likelihood estimator of the attractiveness factor for students attending private institutions in state j (Table 9:I),
z_{5j}	is income from endowment earnings at private institutions in 1959 (in 1,000's of dollars) at state j,
z_{6j}	is income available at private institutions for student aid in 1959 (in 1,000's of dollars) at state j,
z_{7j}	is the number of library volumes at private institutions in 1963 (in 1,000's of volumes) at state j,
z_{4j}	is the population aged 18-29 years in 1960 (in 1,000's) at state j,
b'_o, b_5, b_6, b_7, and b_4	are regression coefficients, and
e	is the error term.

The results of these two analyses are presented in Tables 9:IV and 9:V.

Zero-order coefficients of correlation among the variables are shown in Tables 9:VI and 9:VII. It is evident from comparison of Table 9:VI with Table 9:IV and of Table 9:VII with Table 9:V, that use of four variables accounts for more variance in the attractiveness index than does use of any one single variable. However, the amount of improvement in the ability to account for variance in the dependent variable when using four independent variables is not spectacular. This is due to "overlap" among independent variables; their intercorrelations are high. What are desired in multiple regression analyses are independent variables which have low intercorrelations, yet which in combination account for a large proportion of the variance in the dependent variable. The variables selected as correlates of attractiveness do not fully meet this criterion.

The multiple correlation between the attractiveness estimate for students attending public institutions of higher learning shown in Table 9:I and the four variables chosen as correlates of attractiveness shown in Table 9:IV is .91. This means that these four variables, when used in combination, account for 83 per cent of the variance in the attractiveness estimate. The best single correlate of attractiveness for the public category of students is number of faculty in public institutions of higher learning (variable z_2). As may be observed from Table 9:VI, number of faculty in public institutions explains 61 per cent of the variance in the attractiveness index ($r = .78$). If one adds to this the variable, population 18-29 years of age (variable z_4), the proportion of explained

TABLE 9:IV

Multiple Regression Analysis of Four Variables Related to Attractiveness

Public Institutions: 1963

Variable*	Mean	Standard Deviation	Regression Coefficient	Standard Error of Reg. Coeffic.	Partial Cor. Coeffic.
			-1,183.7087†		
Income from private gifts to public institutions	931.4	1,563.15	- .2095	.0781	-.37
Number of faculty in public institutions	1,865.7	2,011.25	1.0987	.0969	.86
Median school-year completed, persons 25 years of age, or older	10.6	1.11	129.8495	70.8920	.26
Population 18-29 years of age .	519.5	544.14	-2.0240	.3027	-.70

R = .91 R^2 = .83 F = 57.9

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* For explanation of variables, see text. Dependent variable is index of attractiveness.

† Intercept.

TABLE 9:V

Multiple Regression Analysis of Four Variables Related to Attractiveness

Private Institutions: 1963

Variable*	Mean	Standard Deviation	Regression Coefficient	Standard Error of Reg. Coeffic.	Partial Cor. Coeffic.
			165.7697†		
Income from endowment in private institutions	3,665.4	6,834.39	-.1889	.0430	-.54
Income available for student aid in private institutions .	1,025.9	1,822.56	.2786	.1621	.25
Library volumes in private institutions	2,159.0	3,307.76	.4155	.1258	.44
Population 18-29 years of age .	519.5	544.14	.6617	.1881	.46

R = .90 R^2 = .81 F = 51.1

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* For explanation of variables, see text. Dependent variable is index of attractiveness.

† Intercept.

TABLE 9:VI

Zero-Order Correlation Matrix
Attractiveness and Variables Related to Attractiveness
Public Institutions: 1963

Variable*	A'_j	z_{1j}	z_{2j}	z_{3j}	z_{4j}
A'_j	1.00	.52	.78	.25	.48
z_{1j}		1.00	.78	.02	.67
z_{2j}			1.00	.04	.88
z_{3j}				1.00	-.08
z_{4j}					1.00

*** Definitions of variables:**

A'_j	is maximum likelihood estimator of the attractiveness factor for students attending public institutions at state j
z_{1j}	is income from private gifts to public institutions in 1959 at state j
z_{2j}	is number of faculty in public institutions at state j
z_{3j}	is median number of school-years completed by persons 25 years or older in 1960 at state j
z_{4j}	is population 18-29 years of age in 1960 at state j

variance rises to 79 per cent (multiple R = .89).[15] This is very close to the 83 per cent obtained through the use of four independent variables and indicates that the two remaining variables (z_1 and z_3) add but a small amount to the variance accounted for by faculty and student-age population.

It may be noted from Table 9:IV that population 18-29 years of age is negatively correlated with the index of attractiveness for public students when the remaining variables are held constant. That is, the partial correlation coefficient for variable z_4 is negative. It was observed during the preliminary analyses that the relation between the attractiveness index and the size of the 18-29 year age population became negative once the number of faculty was introduced into the regression. This might be interpreted as reflecting the fact that student-age population is an index of the demand for higher education facilities, whereas number of faculty is an index of ability to provide for this demand. Thus, for a fixed number of faculty, states with smaller student-age populations would be in better positions to meet demands of nonresidents and would, therefore, be attractive to inmigrating students.

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[15] This result was obtained during preliminary analyses. The multiple R of .89 is from a regression containing two independent variables: number of faculty, and population 18-29 years of age.

As may be observed in Table 9:IV, the variable, median school-years completed by persons 25 years and older (z_3), is positively related to attractiveness when entered in the regression equation. As indicated in Table 9:VI, this variable is correlated slightly (zero-order $r = .25$) with the dependent variable, attractiveness, but is unrelated to the other correlates of attractiveness: number of faculty, population age 18-29 years, and private gifts to public institutions. The variable, private gifts to public institutions of higher learning (z_1), shows a positive zero-order correlation with the attractiveness index (Table 9:VI), but shows negative regression and negative partial correlation coefficients in the four-variable regression. Th[redacted] is somewhat difficult to account for, since one might expect an increase in private gifts to institutions would have effects which lead to increased attractiveness to migrants. It may be possible that large private donations reflect inadequacy in other forms of financing (e.g., state funds). This could result in a condition unfavorable to student migration.

The use of four independent variables enables one to account for 81 per cent of the variance in the attractiveness index for students attending private institutions ($R = .90$).

TABLE 9:VII

Zero-Order Correlation Matrix
Attractiveness and Variables Related to Attractiveness
Private Institutions: 1963

Variable*	A''_j	z_{5j}	z_{6j}	z_{7j}	z_{4j}
A''_j	1.00	.74	.81	.83	.76
z_{5j}		1.00	.95	.97	.71
z_{6j}			1.00	.97	.69
z_{7j}				1.00	.74
z_{4j}					1.00

* Definitions of variables:

A''_j	is maximum likelihood estimator of the attractiveness factor for students attending private institutions at state j
z_{5j}	is income from endowment earnings at private institutions in 1959 at state j
z_{6j}	is income available at private institutions for student aid in 1959 at state j
z_{7j}	is number of library volumes in private institutions in 1963 at state j
z_{4j}	is population 18-29 years of age in 1960 at state j

However, as was the case with public students, two variables, income available for student aid (z_6) and the population 18-29 years of age (z_4), account for a large part of this explained variance. With these two alone selected as correlates of attractiveness, the multiple correlation coefficient is .85 (72 per cent of the variance accounted for).

The number of private library volumes (variable z_7) appears to be an indicator of the size of the private educational establishment in a state. As noted in Table 9:VII, this variable was the best single indicator of attractiveness for students attending private institutions $(r = .83)$.

When four independent variables are used, the variable, income from endowment (z_5), bears a negative relationship to attractiveness for private students (Table 9:V). This phenomenon is of the same nature as the negative relationship observed between private gifts to public institutions and attractiveness to public students. Evidently, financial variables of this type do not reflect the amount of money available for education as much as they reflect differences in the manner of funding. It appears that the manner in which higher education is funded leads to differential degrees of attractiveness to inmigrants.

Summary and Conclusions

This chapter represents an analysis directed toward isolating correlates of attractiveness of the various states and the District of Columbia to college students migrating from Washington. The analysis consists of three stages:

1. It is assumed that interstate college student migration conforms to a gravity model in which college student migration from state i to state j is given by

$$M_{ij} = k \frac{P_i A_j}{D_{ij}}$$

where

M_{ij}	is the volume of the migration stream from state i to state j ,
P_i	is the student-age population of state i ,
D_{ij}	is the distance from state i to state j ,
A_j	is a parameter measuring the attractiveness of state j, and
k	is a constant of proportionality.

Implicit in the assumption of the gravity model is the notion that the attractiveness parameter A_j can be estimated from interstate migration data using the maximum likelihood principle. The estimate of attractiveness obtained through maximum likelihood is

$$A'_j = \frac{M_{.j}}{V_j}$$

where

$M_{.j}$ is the observed number of college student inmigrants to state j, and

V_j is the student-age population potential of state j.

2. The estimated values of A_j are substituted into the gravity model and regression analysis is performed using numbers of student migrants from Washington to other states as values of the dependent variable. This stage of the analysis provides a test of fit to data.
3. In the third stage of analysis, the estimates of attractiveness, A'_j, obtained in stage 1, become values of a dependent variable in regression in which the independent variables are demographic and educational measures for each of the 50 states and the District of Columbia. This stage provides information on correlates of attractiveness.

Each stage in the analysis was applied separately to each of two categories of students: (1) undergraduates and graduates attending public institutions of higher learning, and (2) undergraduates and graduates attending private institutions of higher learning.

The findings of this analysis of student migration from Washington indicate that the gravity model is reasonably successful in providing estimates of student migration to other states. This model is able to explain 85 per cent of the variance in the size of migration streams for the public student category ($R = .92$) and 95 per cent of the migration stream variance for the private student category ($R = .98$). The findings also indicate that inmigration divided by population potential provides a better estimate of attractiveness than does inmigration alone.

These results appeared to justify the use of A_j as a measure of attractiveness to college students leaving Washington State, and a second set of regression analyses were performed in which A'_j, the attractiveness index for public students, and A''_j, the attractiveness measure for private students were dependent variables. The results indicated that for public students, attractiveness was related to: (1) population 18-29 years of age, (2) private gifts to public institutions, (3) number of faculty in public institutions, and (4) median school-years completed by persons 25 years or older. These four variables, measured at destination states, accounted for 83 per cent of the variance in the attractiveness index A'_j for public students ($R = .91$).

For the category, students attending private institutions of higher learning, the correlates of attractiveness were: (1) population 18-29 years of age, (2) endowment income in private institutions, (3) income available for student aid in private institutions, and (4) number of library volumes in private institutions. These independent variables accounted for 81 per cent of the variance in the attractiveness index A''_j for private students ($R = .90$).

The ultimate purpose of an analysis such as presented in this chapter is, of course, prediction of interstate college student migration streams. Some of the findings are certainly relevant to prediction. For example, the use of a gravity model implies that distance is an important factor in college student migration.[16] College students are differentially attracted by factors characterizing the states of destination. However, such factors are of themselves of little value in predicting the volume and direction of migration streams unless they are in some way weighted by distance as they are in the gravity model.

Throughout the analysis, emphasis has been placed on destination factors as determinants of migration. It is true that student-age population at the source of a migration stream has been incorporated into the model, but this step was aimed at providing information relating to the volume of a migration stream, not its direction. However, factors at the origin of a stream: cultural factors, educational factors, economic factors, etc., may influence choice of a destination. One may observe from Table 9:III, for example, that attractiveness factors measured at destinations overstate migration estimates from Washington to the Plains and Southeast regions of the United States. The attractiveness estimates for states in these regions incorrectly assess the appeal of these regions to students leaving Washington. Probably, satisfactory predictions of interstate student migration will involve models which take into account influences at both ends of migration streams. Origins will have to be considered, as well as destinations.

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[16] For students attending public institutions, the correlation between 1/D (D = distance) and the size of migration streams from Washington State was .68; for students attending private institutions, the corresponding correlation was .69.